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DISEASES CAUSED BY BACTERIA AND FUNGI.

EDWARDS, P. R. (1932). **The Biochemical Characters of Human and Animal Strains of Hemolytic Streptococci.**—*J. Bact.* **23.** 259-266. 3 tables. [12 refs.]

The work was concerned with 90 strains of animal origin and 36 of human origin, all of which were characterized by low acid production in glucose broth (pH not below 4·9), inability to split sodium hippurate, intolerance of methylene blue and active production of haemolysin in liquid media; 70 of the animal strains were from equines, 5 from bovines, 9 from chickens and 6 from swine.

The limiting pH in glucose broth was from 4·9 to 5·2 for the animal strains and from 5·4 to 6·0 for the human strains. All of the 36 human strains fermented trehalose but not sorbitol; 18 fermented glycerine, though often slowly and to a slight degree. Of the 90 animal strains 85 fermented sorbitol but not trehalose or glycerol, whilst 5 fermented trehalose and glycerol, but not sorbitol; 4 of these did not ferment lactose.—A. W. STABLEFORTH.

LOEWENTHAL, H. (1932). Ein Streptokokkenstamm von ungewöhnlicher Pathogenität. [**A Streptococcus Strain of Unusual Pathogenicity**].—*Zschr. Hyg. u. Infektkr.* **113.** 445-456. 4 tables. [6 refs.]

A haemolytic streptococcus, " M-Streptokokken " was found to be the cause of a fatal spontaneous epidemic in mice. The organism was highly virulent when administered to mice orally or by nasal infection, but only of moderate pathogenicity for rabbits. By bringing healthy mice into contact with artificially infected ones the disease was found to spread rapidly. Mice could be successfully protected against a fatal dose of the streptococcus by previous injection of increasing doses of heat-killed culture.—S. J. EDWARDS.

SEELEMANN, M., & HADENFELDT, A. (1932). Zur Frage der Identität des Streptococcus pyogenes (haemolyticus) mit dem Streptococcus epidemicus Davis und seine Bedeutung für die Milchhygiene. [**On the Question of the Identity of** *Str. pyogenes* (*haemolyticus*) **with** *Str. epidemicus* **Davis and its Significance in Milk Hygiene**].—*Zlb. Bakt. I.* (*Orig.*). **126.** 231-240. [23 refs.]

WILLIAMS, Anna W., GURLEY, Caroline R., SOBEL, Eva, & CASTELDA, Margaret. (1932). **Milk-Borne Septic Sore Throat and Scarlet Fever and their Relation to Beta Hemolytic Streptococci.**—*J. Bact.* **23.** 241-258. 1 table. [21 refs.]

The authors of both articles conclude from a discussion of the literature as well as from their own work (in the case of the first group of workers, previously presented) that the only characters claimed as specific for *Str. epidemicus*—capsule formation and moist growth on blood agar—are inconstant, and that there is, therefore, no ground for the use of the name *Str. epidemicus*.

Seelemann and Hadenfeldt find that the characters mentioned disappear after subculture and that the actively haemolytic and pathogenic streptococci from the cow's udder, termed *Str. pyogenes* or *Str. epidemicus* respectively by different workers, are similar.

Williams and her co-authors give the results of a study of the general characters and absorptive capacities for a dozen sera, of 60 strains from various sources, including septic sore throat. They conclude that an epidemic of scarlet fever or septic sore throat may be caused by one or several agglutinative types. If scarlet fever predominates the strains are generally of one of the common scarlet fever types. If septic sore throat is predominant, the epidemic strain may be one of several types, two of which are newly demonstrated and named, tentatively, epidemicus agglutination types I and II.—A. W. STABLEFORTH.

HÖKL, J., PETROV, G., & KREJCI, A. (1932). Ein experimenteller Beitrag zur Feststellung der Pathogenität von Streptokokkenstämmen krankhaft veränderter Kuhmilch für den Menschen. [**An Experimental Contribution to the Determination of the Pathogenicity for Man of Strains of Streptococci from Diseased and Altered Milk**].—*Arch. Hyg. Bakt.* **107.** 309-317. [31 refs.]

Three workers in the laboratory concerned consumed, on several occasions, from 8 to 250 c.c. of a 16 to 48-hour culture in milk of *Str. agalactiae*, or of a streptococcus which, as far as was ascertained, only differed from this in that it produced a turbidity in plain or lactose broth and was slightly pathogenic for guinea pigs intraperitoneally (dose from 3 to 5 c.c.). No ill-effects were noted up to four to eight months later.—A. W. STABLEFORTH.

SCHMIDT-HOENSDORF, F., & SCHMIDT, W. (1932). Der Einfluss der Art des Melkens und der Umwelt auf die Entstehung und den Verlauf der Streptokokken-Mastitis. [**The Influence of the Manner of Milking and the Environment on the Origin and Course of Streptococcal Mastitis**].—*Tierärztl. Rdsch.* **38.** 866-868. [10 refs.]

The authors have already shown that frequent stripping does not influence the possibility of producing mastitis by artificial infection *via* the teat canal, but that it exerts a favourable influence on the course of the disease thus produced.

In the first of these further experiments, eight normal cows were carefully cleansed, disinfected and placed in a clean stall in which cows had never stood. All were machine-milked, four were stripped and four were not. No mastitis developed in either group within the three months period of observation.

In the second experiment 40 animals were used, the conditions being similar to those of the first except that the stall was an ordinary cow stall. Within four and a half months all except nine of the cows had developed mastitis. Moreover, no significant difference could be found between the group which had, and that which had not been stripped.

The animals were selected on the basis of clinical and laboratory examinations made three or four times in the month preceding experiment. None showed streptococci, but one half showed slightly or moderately abnormal cell content; the remainder were classed as normal in every way.—A. W. STABLEFORTH.

SEELEMANN, M. (1932). Die Streptokokkeninfektionen des Euters und ihre Bedeutung für die Milchhygiene. [**The Streptococcal Infections of the Udder and their Significance in Milk Hygiene**].—*Milchwtsch. Forsch.* **12.** 518-525. [5 refs.]

In a brief general review attention is drawn to the fact that mastitis may be caused by various streptococci. Those which are usually found are non-pathogenic to man. The milk from infected quarters should, however, on general grounds be excluded from the market. Contrary to experience in North America, there has been up to the present time in Germany no clear case of human disease due to consumption of milk from mastitis-infected cows.

Strongly haemolytic and pathogenic streptococci similar to the *Str. epidemicus* of American workers have, however, recently been discovered in Germany. It is therefore necessary to carry out more careful epidemiological and bacteriological observations on any future occasion where an association between human disease and consumption of milk from cows affected with mastitis appears to be possible.

—A. W. STABLEFORTH.

HUCKER, G. J., & UDALL, D. H. (1933). **Relation between the Presence of Fibrotic Tissue in the Udder and Streptococci or Cells in freshly drawn Milk.**—*Cornell Vet.* **23.** 32-39. 4 tables. [3 refs.]

The authors have tried to establish the relationship between the presence of scar tissue or induration of the udder and streptococcus infection. For this purpose the udders of 71 cows were examined thoroughly, after milking, at intervals over five months. Every ten days the milk was examined and the cell count and numbers of streptococci present estimated.

Of 284 quarters studied in this way, 66 were found to be free from hardened areas or indurations and these showed no streptococci in the milk; of the quarters showing various degrees of fibrosis, a certain proportion only contained streptococci.

Regarding the relationship between udder fibrosis and cell content of the milk, the authors found that udders free from scar tissue did not yield cells in excess of 500,000 per c.c. whereas indurated quarters usually showed a higher count. Again, when the reaction of the milk was tested by means of the bromthymol-blue test, it was found that none of the physically normal quarters gave a positive reaction, but a certain number of indurated quarters showed an alkali reaction.

As a result of these observations, the authors suggest that a marked fibrosis of the udder indicates infection with streptococci and that, by eliminating cows showing such fibrosis the spread of infection would be diminished.

—S. J. EDWARDS.

WOOLPERT, O. C., & DACK, G. M. (1933). **Relation of Gastro-Intestinal Poison to Other Toxic Substances Produced by Staphylococci.**—*J. Infect. Dis.* **52.** 6-19. 4 tables. [12 refs.]

Staphylococcal filtrates often contain toxic substances which may effect necrosis of the skin or subcutaneous tissue, haemolysis of cells *in vitro*, death in susceptible animals after intravenous administration and gastro-intestinal symptoms following ingestion.

A study was made as to the relationship of the various types of toxic substances

and, although in no case was the gastro-intestinal toxic substance produced without the production of the other toxic filtrates, the authors consider it to be a separate substance. It was more resistant to heating and adsorption than the other toxic substances and was not neutralized by antiserum effective against the others.

The method of production of the toxic filtrates was by growth of the organism on semi-solid medium in a partial carbon dioxide atmosphere.—R. LOVELL.

SPINELLI, A., & PENSO, G. (1932). Setticopioemia dulle lepri a carattere epizootico. [**Epizootic Septic Pyaemia of the Hare**].—*Clin. Vet. Milan.* **55.** 173-189. 5 figs. [7 refs.]

The disease first attracted attention in the province of Pisa in 1927, among hares living in a wild state. There had been no recent importations of animals and it was thought that it had spread from rabbits on the land.

The first examination of diseased hares was made at the end of 1928. The affected hares showed depilation of the back and flanks and slight ulceration of the external genital organs. The spleen was found to be markedly enlarged and softened and there were peritoneal adhesions, but no sign of exudation. There was enlargement of the testicles, the substance of which was converted into a firm cheesy pus enclosed in a fibrous capsule.

A number of diseased hares were obtained for further examination and details of the findings are given. The disease appeared to take three forms. Two of these affected the genital organs and the intestine; the third form was a septicaemia.

Bacteriological investigations showed that a Gram-positive micrococcus was present in the lesions. It occurred singly and in pairs, but rarely in clusters. Agglutination tests with sera from a number of the hares yielded positive results with all of the strains recovered in the majority of cases. The titre ranged from 1 : 80 to 1 : 2,560.

The organism was pathogenic for the guinea pig and the mouse, causing death in three or four days with suppurative centres in the liver and kidneys and suppurative peritonitis in some instances. Filtration experiments proved negative.
—A. LESLIE SHEATHER.

SARWAR, S. M. (1932). **Viability of Anthrax Bacilli and Spores after Fixation and Staining.**—*Ind. J. Vet. Sci. & Anim. Husb.* **2.** 393-396. 3 tables.

The author determined the amount of heat necessary to sterilize anthrax films containing either vegetative or spore forms.

Vegetative forms.—These require the passage of the slide through a Bunsen flame four or five times taking " one second for each passage " and necessitate a heat of 220°C. to kill the bacilli.

Spore forms.—These require the passage of the slide through a Bunsen flame at least nine times and the raising of the surface temperature of the slide to 320°C. before the slide may be considered innocuous.—EDWARD F. PECK.

I. BASSET, J. (1933). Immunisation contre le charbon bactéridien par les produits solubles non pathogènes de culture jeune. [**Immunization against Anthrax by the Non-Pathogenic Soluble Products of a Young Culture**].—*C. R. Soc. Biol. Paris.* **112.** 173-176. [2 refs.]

II. HRUSKA, C. (1933). De la vaccination par la Bactéridie charbonneuse glucosidée chez les Bovidés. [**Vaccination by the Use of a Saponified Anthrax Culture in Bovines**].—*Ibid.* 771-772. [3 refs.]

I. Anthrax cultures were grown for three days at 35°C. and then filtered

through a Chamberland L_3 candle. 20 c.c. of such a filtrate proved innocuous for guinea pigs and rabbits ; in rabbits repeated dosage appeared to augment resistance against a test dose of virulent bacilli given 20 days after the last injection. In sheep a definite degree of immunity was obtained in some cases ; in some cases, however, the only degree of protection afforded was a prolongation of the incubation period.

II. This author recommends the use of a vaccine prepared by emulsifying a 48-hour culture of Pasteur's second vaccine in a 4 per cent. saponin solution. The injection of 0·5 c.c. of such an emulsion into bovines appears to protect from natural infection. Of 1,810 animals inoculated this way, only 3 died, compared with 47 out of 1,419 done by Pasteur's method, and 42 out of 3,664 non-vaccinated animals.

[From these figures we must conclude that either Pasteur's vaccination results in heavier losses than would occur in natural infection or that the control figures have been taken from areas with a varying incidence of the disease].

—Norman Hole.

Hibma, A. M. (1932). De strijd tegen de tuberculose onder het Rundvee op Terschelling. [**Combating Tuberculosis in Cattle on the Isle of Terschelling**]. —*Tijdschr. Diergeneesk.* **59.** 141-144. 1 table. [1 ref.] [Summaries in English, French and German : abst. from orig.]

The author reports that, on the Isle of Terschelling (Holland), livestock consisting of 2,250 animals has successfully been freed from tuberculosis by removing all reactors to the ophthalmic tuberculin test and that it is maintained free from tuberculosis by importing non-reacting animals only.

—B. J. C. te Hennepe (Rotterdam).

Eshuis, J. (1932). Een en ander over tuberculose-bestrijding in Twenthe en het werk van der keuringsdienst van waren te Enschede op Melkhygienisch gebied. [**Tuberculosis Control in Twenthe and the Work of the Food Inspection Service at Enschede in regard to Milk Hygiene**].—*Tijdschr. Diergeneesk.* **59.** 774-778. 1 fig. [1 ref.]

In the Commune of Lonneker in the province of Twenthe (or Overyssel) a co-operative dairy society has carried out systematic tuberculosis control since 1922. In the first place, a clinical examination only was instituted and the percentage of cattle removed from the herds was 1·4 per cent. in 1922, 0·44 per cent. in 1923 and 0·39 per cent. in 1924. In 1923 part of the cattle were subjected to the ophthalmic tuberculin test and, of 1,741 animals tested, 213 (12 per cent.) reacted. Since 1924 all the cattle have been subjected to the test and the Food Inspection Service at Enschede has carried out a campaign to control streptococcal mastitis. Excellent results have been obtained ; the farmers have been won over and even without government grants the cost is not excessive. Lonneker is stated to be the only district where this work is carried out on the farms exclusively by veterinary surgeons.—F. Bullock.

van Heelsbergen, T. (1932). Vogeltuberculose bij het Rund. [**Avian Tuberculosis in Cattle**].—*Tijdschr. Diergeneesk.* **59.** 1093-1106 and 1166-1180. [3 refs.] [Summaries in English, French and German : abst. from orig.]

The article gives a review on avian tuberculosis in the cow, the sheep and the goat. Attention is drawn to the fact that the chance of contamination must be very great, as tuberculosis often occurs in birds. In different cases it has been

shown that the cow is susceptible to infection with avian tubercle bacilli, so that avian tuberculosis occurs much more than is generally diagnosed.

The lesions are mainly seen in the lymphatic glands of the digestive tract, but the lungs, liver and other organs may also be affected. A very remarkable symptom in the cow, caused by avian tubercle bacilli, is abortion (uterine affection). An important fact for human beings is that an infected animal is able to excrete avian tubercle bacilli with the milk. As the infection is more frequent than is generally supposed, readers will not be surprised to know that avian tubercle bacilli have already been found in mixed milk on different occasions.

In the article brief reference is given to affections such as " skin and subcutaneous lesions " and Röckl's granuloma and paratuberculosis, as the aetiological connection between these diseases and avian tuberculosis may not be considered an impossibility.—B. J. C. te Hennepe (Rotterdam).

I. Hoffmann, J. A. (1932). Tuberkulose beim Pferd mit tödlichem Ausgang. [**A Case of Tuberculosis in a Horse with Fatal Results**].—*Münch. tierärztl. Wschr.* **83.** 100.

II. Lachenschmid, B. (1932). Die sogenannte knotige Muskeltuberkulose des Rindes. [**The So-Called Nodular Muscle Tuberculosis in Cattle**].—*Ibid.* 581-583. 1 plate. [3 refs.]

III. Suffa, O. (1932). Ein interessanter Fall von Gehirnreizungserscheinungen, hervorgerufen durch Gehirntuberkulose. [**A Case of Tuberculosis of the Brain with Interesting Symptoms**].—*Tierärztl. Rdsch.* **38.** 799-800.

I. This is a description of a case of extensive tuberculosis in a ten-year-old mare. The symptomatology was peculiar. The temperature fluctuated greatly within a short space of time, the mare being one day feverish (with a temperature of 103·1°F.), dull and without appetite and the next day quite the reverse. There was some oedema of the udder and the urine contained blood from time to time. The animal died and the *post-mortem* examination revealed extensive tuberculosis of the lungs including the pleura and nodular formation on the peritoneum with suppuration and calcification. The mesenteric glands, liver and kidney were much swollen. The author is of the opinion that the infection took place *via* the intestine.

II. Nodule formation in the musculature of cattle is of rare occurrence, but some 25 cases have been recorded, the aetiology of which has been variously ascribed to *Mycobact. tuberculosis*, blastomycosis, fibrosarcoma, etc.

The author describes in detail the macroscopic and microscopic appearances of various organs (axillary lymphatic gland, testicle) and muscle obtained from a four-year-old bull killed in the slaughterhouse at Munich. The bull appeared to be in good condition and showed no symptoms of disease.

The greyish-yellow nodules were firm and oval and about the size of a hazel nut. They lay lengthwise along the muscle either on the surface or in the intermuscular spaces and were clearly defined from the healthy tissue. The musculature of the whole body was said to be similarly affected.

Examination for acid-fast organisms and guinea pig inoculations gave negative results. The histological picture was that of a typical granuloma. The author concludes that there is not sufficient evidence to classify the nodules as true tuberculous lesions.

III. The symptoms and *post-mortem* appearance of an in-calf heifer which was affected with tuberculosis of the brain are described.

The animal was first noticed in a severely dazed condition after having been attacked by a bull. She was unable to stand, was gazing wildly about, swinging

her head and breathing rapidly. One leg was greatly swollen and the skin excoriated. Local applications and rest at first brought about recovery, but the animal became paralysed again two days later. Insufflation of the udder with air and an injection of adrenalin were at first successful, but several days later a relapse occurred. Slaughter was recommended and at the *post-mortem* examination tuberculous infection of the peritoneum and pleura was found and the surface of the brain was covered with nodules the size of a millet seed.—N. S. BARRON.

BARTEL, H. (1933). Beitrag zur Aufschliessung der Tuberkelbakterien durch Extrakte aus den Gelenkenden der Knochen von Kälbern und Kalbsfoeten. [**Degeneration of the Tubercle Bacillus in Extracts of Joints of Calves and Calf Foetuses**].—*Tierärztl. Rdsch.* **39.** 323-326 and 343-345.

This article describes the alteration of the outer coat of *Mycobact. tuberculosis* by enzymes extracted from joint cartilage, only bovine types of the bacillus being examined. The enzyme was extracted from pulped cartilage with glycerine from which it was adsorbed by calcium phosphate. Saline suspensions of cultures of tubercle bacilli were added to cartilage extract. [It is not clear how long the extract takes to act].

Cartilage extracts from foetuses and calves up to eight months old have the capacity to destroy the acid-fast character of *M. tuberculosis*. The activity of extracts depends upon the time they are allowed to act upon the organisms and upon the age of the cultures used.—E. J. PULLINGER.

HOLTH, H. (1932). Avsluttende undersøkelser over bacilltypene ved tuberkulose hos svinet. [**Conclusions on the Types of Bacilli occurring in Swine Tuberculosis**].—*Norsk Vet.-tidsskr.* **44.** 129-136. 1 table. [2 refs.] [Summary in English : abst. from orig.]

Continuing his reports on the types of infection encountered in tuberculosis in human beings and animals, the author quotes from the recent work of GRIFFITH and other authors and of SVANBERG and describes three new cases of swine tuberculosis caused by the human type. This is not uncommon in Norway and the fact should be of value in the diagnosis of tuberculosis in farmers.—J. E.

KLIMMER, M. (1932). Zum Vorkommen von Tuberkelbakterien in Eiern. [**The Occurrence of Tubercle Bacilli in Eggs**].—*Berl. tierärztl. Wschr.* **48.** 737-739. 1 table. [20 refs.]

The author gives a résumé of the findings of other workers upon this subject. Animal inoculation and cultural and microscopic methods of diagnosis have been used in the investigation, but no actual technique is described so that it is not possible to gauge the value of the figures of various workers.

Out of slightly over 1,000 commercial eggs from various sources described by different workers, 1·4 per cent. were found to contain tubercle bacilli, whilst out of 1,333 eggs from tuberculous fowls, 5·7 per cent. were infected.

—E. J. PULLINGER.

I. GRIFFITH, A. S. (1932). **Human Tuberculosis of Bovine Origin.**—*Edinburgh Med. J.* **39.** 177-189. 3 tables. [Presented at the Meeting of the Tuberculosis Society of Scotland, October 23rd, 1931].

II. GRIFFITH, A. S. (1932). **The Bovine Tubercle Bacillus in Human Tuberculosis.**—*Brit. Med. J.* Sept. 10th. 501-503. [Presented in opening a discussion in the Section of Tuberculosis at the Centenary Meeting of the British Medical Association, London, 1932].

I. The author reviews the investigations which have been made to determine the part played by the bovine organism in human tuberculosis and discusses measures for safeguarding the community against tuberculosis of bovine origin. Reference is made to the wide differences in the proportional frequency of bovine infections in human beings in the different countries and even in different parts of the same country, the incidence being greater in Scotland than in England. The total number of cases in Great Britain in which the infecting types have been determined now approaches 3,000, sufficient to show that in human tuberculosis only the human and bovine types of organism are found.

Clinical and *post-mortem* data are insufficient to distinguish the two types of infection, but a study of the bacteriological characters of the organism always enables one to determine the original source of the infection. A table is given showing that the bovine type was responsible for 58 to 85 per cent. of cases of infected cervical glands and of skin tuberculosis in children under the age of five and for nearly 50 per cent. of the cases in children of 5 to 14 years. It was also responsible for nearly one-third of cases in children under the age of five in which the bones, joints and meninges were involved. In meningitis the bovine percentage was high and did not vary much at different age periods, whereas in the other varieties it diminished rapidly with advancing age.

The author points out the fallacy of the statement that bone and joint tuberculosis in children is generally caused by the bovine type. In this form of tuberculosis the human type is responsible for three-quarters of the cases in children under the age of five and over four-fifths in persons of all ages. Reference is made to the changes in pathogenic properties which occur in tubercle bacteria affecting skin tissues. A table is given showing the combined figures for Scottish investigations and these show that the percentage incidence of bovine infection is higher for Scotland than in England and that south-west Scotland is the worst affected area.

Pulmonary tuberculosis is caused by the bovine type more frequently than is generally assumed. In Great Britain there have been found to date no fewer than 29 persons suffering from ulcerative pulmonary tuberculosis caused by the bovine type of organism. At one sanatorium, 19 persons out of 454 were expectorating bovine tubercle bacilli with the sputum. The author states that no reliable evidence has yet been adduced of the transformation of the bovine type into the human type even after existence in the human body for as long as 52 years. He believes that the bovine type of organism is at least as virulent for human beings as the human type. The smaller proportion of bovine infection in adults is believed by the author to be due to the less frequent consumption of cows' milk in the raw state. Reference is made to the danger of the doctrine that a few bovine bacilli in milk are permissible for their protective action.

The facts and figures presented show how imperative is the need for measures to improve the milk supply of Great Britain. The arguments against pasteurization are " as the small dust of the balance compared with the proved danger of contracting tuberculosis by drinking ordinary cow's milk."

The paper concludes by giving suggestions with regard to the eradication of tuberculosis in cattle.

II. The author covers much the same ground as that covered by his paper to the Tuberculosis Society of Scotland. He further states that from 18 children who died this year from tuberculous meningitis he obtained the bovine organisms in 33·3 per cent. of cases. He believes that " at the present time children are being infected with bovine bacilli which in years to come will produce in some of those who escape early acute fatal disease the most serious of all forms of human tuberculosis, namely ' phthisis pulmonalis '." During the past year 18 cases of phthisis

have been found in England with bovine organisms in the sputum. In Scotland seven more such cases of phthisis have been found during the year. Reference is made to those types of tubercle bacteria of human origin which do not always correspond exactly either with the human or the bovine type, though clearly belonging to the mammalian type. The author believes that these strains represent merely temporary or quasi-permanent variants of one or other of the human and bovine forms and has found that they are often capable of complete reversion to the original type. There is no direct evidence to support the view that bovine tuberculosis is responsible for more cases of human tuberculosis than can be ascertained by the ordinary bacteriological methods.—S. H. GAIGER.

I. LEDERMANN, K. G. (1932). Die Tuberkelbazillentypen bei der Hauttuberkulose. [**The Types of Tubercle Bacilli in Tuberculosis of the Skin**].—*Med. Klinik.* **28.** 51-54 and 83-85. 11 tables. [2 refs.]

II. GRIFFITH, A. S. (1932). Die Tuberkelbazillentypen beim Lupus. [**The Types of Tubercle Bacilli in Lupus**].—*Zschr. Tuberk.* **64.** 108-119. 3 tables. [9 refs.]

I. A long review points out that bovine and human types of tubercle bacilli may be isolated from human cases of lupus and that the bovine type may produce all forms of this skin disease. Many tables are given indicating that, in countries other than England, bovine tubercle bacilli may be responsible for 8·7 per cent. of all forms of human tuberculosis. Two separate sets of figures are quoted for England, one showing 16·5 and the other, a later estimate, giving the figure of 20·7 per cent. as the incidence of all forms of tuberculosis in human beings due to the bovine type of bacillus.

II. Also a review of the types of tubercle bacillus found in various forms of human tuberculosis. Both in the English and Scottish statistics the highest incidence of infection with the bovine type is in cervical gland infection and lupus. Of cultures isolated from the skin of 188 cases of lupus, 95 were of the human type, 4 of which were dysgonic, and 93 were of the bovine type of which one strain was relatively eugonic. The virulence of 62 of the 93 bovine type of bacilli was below standard virulence for experimental animals (rabbits, calves and goats), approximating more nearly to the virulence manifested by bacilli of human type. Of the 95 human type, only 34 were highly virulent for guinea pigs, the remainder being of sub-standard virulence for this type of bacillus. It appears probable that this common change of lower virulence is occasioned by residence of bacilli in the skin and that lupus is originally caused by bacilli of normal virulence. By animal passage it is possible to restore the virulence of many of the strains. —R. LOVELL.

DOYLE, T. M. (1933). **The Transmission of Tuberculosis by Contact from Infected to Healthy Guinea-Pigs, with Reference to Some Recent Work on B.C.G. Vaccine.**—*Vet. J.* **89.** 30-34. 1 plate. [5 refs.]

In this paper the author gives details of an experiment which shows that healthy guinea pigs contract tuberculosis when kept in contact with tuberculous guinea pigs. Although unable to demonstrate that infection also takes place by indirect contact, he considers that the findings of other observers place this beyond doubt.

The author also discusses the significance of such spontaneous guinea pig infection in the light of the recent experimental work of WATSON, MCINTOSH and KONST with BCG vaccine and states " as it is now established that B.C.G. vaccine does not give rise to progressive tuberculous lesions capable of sub-inoculation

into susceptible animals, it is probable the tuberculous infection in guinea-pigs inoculated with B.C.G. observed by the Canadian investigators arose spontaneously."—GWILYM O. DAVIES.

BOQUET, A. (1932). Sur la bacillémie et la virulence des tissus apparemment sains des Cobayes tuberculeux. [**Bacillaemia and the Virulence of apparently Healthy Tissues of Tuberculous Guinea Pigs**].—*C. R. Soc. Biol. Paris.* **109.** 1166-1169. [5 refs.]

The experiments show that tissues such as the skin, testicle and lymphatic glands situated away from the initial seat of infection can remain free from infection.

It appears that tubercle bacilli can circulate indefinitely in the blood stream without causing the smallest lesion. It is considered that the bacillary metastases and localization of infections depend directly upon the local factors, toxic, inflammatory, allergic or simply mechanical, which favour the fixation of the organisms carried by the blood.—NORMAN DOBSON.

SAENZ, A., & COSTIL, L. (1933). Sensibilité comparée des milieux de culture et de l'inoculation au Cobaye pour l'isolement des Bacilles tuberculeux. [**Comparative Sensitiveness Tests between Culture Media and Guinea Pig Inoculation for the Isolation of Tubercle Bacilli**].—*C. R. Soc. Biol. Paris.* **113.** 50-53. [1 ref.]

The authors recorded in a previous article [see this *Bulletin.* **3.** 462.] the marked sensitiveness of Löwenstein and Petragnani's (modified) medium for the isolation of tubercle bacilli. The present note deals with some observations carried out to determine if these media were more sensitive than guinea pig inoculation for the isolation of tubercle bacilli and it is shown that the guinea pig proved to be slightly more sensitive than the culture media for the isolation of the bacilli.

The cultural method possesses, however, some advantages over the biological method ; for example, on the basis of the naked eye appearances of the colonies it permits the differentiation of bovine from human strains.—T. M. DOYLE.

REMLINGER, P., & BAILLY, J. (1932). Sur la réceptivité des Gerbilles algéro-tunisienne (*Meriones shawii* Rozet) et marocaine (*Gerbillus campestris* Levaillant) à la Tuberculose. [**The Receptivity of Algerian and Tunisian Gerbilles and of the Moroccan to Tuberculosis**].—*C. R. Soc. Biol. Paris.* **109.** 1076-1077.

The Algerian gerbille and the Moroccan species infected *per os* and subcutaneously with *Mycobact. tuberculosis* gave identical reactions. The reactions following infection with the bovine and human types show these animals to be more susceptible to the bovine type.—NORMAN DOBSON.

SCHORNAGEL, H. (1932). Tuberkulose en het " Keurings regulatief." [**Tuberculosis and Legislation**].—*Tijdschr. Diergeneesk.* **59.** 1261-1271. [Summaries in English, French and German : abst. from orig.]

When inspecting meat for tuberculosis the anatomical changes are the only indications of the presence of circulating bacilli in the blood during or just before slaughter. The presence of very minute tubercles makes it evident that micro-organisms were in circulation 10 to 14 days previously. The presence of very young small foci in the kidney indicates recent dissemination of bacilli in the blood, but tubercles visible to the naked eye have been in existence for at least three weeks. The kidney frequently contains minute submiliary non-tuberculous centres. Symptoms of a recent blood infection are sometimes seen, in which case

the spleen is dark and swollen, the pulp rather soft with irregular scattered prominent lymphatic follicles containing microscopic tuberculous foci ; the liver and kidney are slightly swollen with dull grey minute areas. Swelling of the lymphatic glands is usually a reaction to toxins and is not caused by circulating micro-organisms. Macroscopic examination of organs, especially lymph glands, is useless for the detection of very recent infections. Histological examination of the lymph glands, however, must be carried out. The presence of epithelioid cells, giant cells and numerous plasma cells justifies the diagnosis of a recent blood infection. The author insists upon the sterilization of meat in such cases.

—VAN DER HOEDEN (UTRECHT).

I. WOLTERS, K. L., & DEHMEL, H. (1932). Vergleichende Züchtungsversuche von bovinen Tuberkelbakterien auf Z-Einährboden nach Hohn und Malachitgrüneinährboden nach Petragnani unter Berücksichtigung der Typendifferenzierung. [**Comparison of the Growth of Bovine Tubercle Bacilli on Hohn's Z-Egg Medium and Petragnani's Malachite Green Egg Medium and the Differentiation of Types**].—*Zlb. Bakt. I.* (*Orig.*). **124.** 199-204. 1 table. [16 refs.]

II. SAENZ, A., & EISENDRATH, D. (1932). La " microculture " du virus tuberculeux et son importance pour le diagnostic précoce de la tuberculose rénale par l'ensemencement des urines. [**The " Microculture " of the Tubercle Bacillus and its Importance for the Early Diagnosis of Renal Tuberculosis by Cultivation from Urine**].—*Ann. Inst. Pasteur.* **49.** 608-613. 3 tables. [5 refs.]

III. FELDMAN, W. H. (1932). **A Simplified Egg Medium for the Cultivation of Mycobacterium Tuberculosis.**—*Amer. Rev. Tuberc.* **26.** 187-191. 1 table. [3 refs.]

I. The authors compared the value of the following media for the isolation of tubercle bacilli from the infected organs of cattle and pigs :—(a) Hohn's Z-Egg medium ; (b) the same medium without glycerine ; (c) Petragnani's medium and (d) the same medium without glycerine. The Z-Egg medium was prepared according to the directions of Hohn, [see this *Bulletin.* **2.** 538.] except that the haematin was made from sheep's blood.

After maceration with 15 per cent. hydrochloric acid the infected material was spread in equal amounts on the surface of the different media. In order to detect the earliest growth, smears were made at intervals from the surface of the media and examined for clumps of acid-fast bacilli. Results showed that Petragnani's medium containing no glycerine was superior to the others, and in this case growth could be detected generally in 18 days. Tubercle bacilli were recovered from all 17 specimens examined whereas there was no growth from four of these when tested on Z-Egg medium.

These observations show that the addition of haematin is of no special advantage for the growth of bovine tubercle bacilli.

The authors have also studied the value of these media for differentiating types of tubercle bacilli and conclude that the Z-Egg medium is suitable for distinguishing the growth of the human and bovine types, but possess no advantage over Petragnani's medium. Further, the latter medium is more suitable for the differentiation of bovine and avian types.

II. In order to arrive at an early diagnosis in cases of human renal tuberculosis, the authors have found cultural methods superior to animal inoculation and direct examination. The technique employed was to spread the deposit obtained from 20 to 50 centrifuge tubes of urine on the surface of either Löwenstein's or

Petragnani's medium, these media having been found most suitable for promoting growth of human or bovine tubercle bacilli. In a large proportion of the cases, it was possible to detect the presence of tubercle bacilli by microscopic examination of the surface of the medium after eight days incubation.

III. A simple medium for the cultivation of human and avian tubercle bacilli is described consisting of egg-yolk and glycerine water.—S. J. EDWARDS.

WANG, L. (1932). Sur la valeur des milieux de Sweany et Evanoff pour la culture du Bacille de Koch. [**On the Value of Sweany's and Evanoff's Media for the Cultivation of** *Mycobact. tuberculosis*].—*C. R. Soc. Biol. Paris.* **111.** 619-621. 2 tables. [1 ref.]

The value of several media recommended by SWEANY and EVANOFF for the cultivation of *M. tuberculosis* was tested and found to be inferior to those generally used, e.g. Löwenstein's and Petragnani's.—H. G. LAMONT.

BEERENS, J. (1933). Prémunition du Cobaye par injections sous-cutanées répétées de faibles doses de Bacilles BCG. [**Immunization of the Guinea Pig by Repeated Subcutaneous Injections of Small Doses of BCG**].—*C. R. Soc. Biol. Paris.* **112.** 120-122. [2 refs.]

By a series of experiments it is shown that the repeated subcutaneous injection every other day, 20 to 30 times, of 0·01 mg. of BCG protects guinea pigs against a subcutaneous test dose of 0·0001 mg. of a virulent bovine strain of tubercle bacilli. If, however, the total amount of BCG employed (0·2 to 0·3 mg.) is administered subcutaneously at a single injection it is found that the same immunity does not result.—GWILYM O. DAVIES.

I. SAENZ, A. (1932). Étude comparative entre l'allergie expérimentalement provoquée par le BCG et celle produite par le Bacille virulent. [**Comparative Study of the Allergic Reaction induced by BCG and that produced by Virulent Bacilli**].—*C. R. Soc. Biol. Paris.* **111.** 298-300.

II. VANDESTRATE, M. (1932). Sur l'élimination des Bacilles tuberculeux virulents de surinfection par la voie hépato-biliaire chez le Cobaye vacciné par le BCG. [**The Excretion with the Bile of Virulent Tubercle Bacilli inoculated into Guinea Pigs previously vaccinated with BCG**].—*Ibid.* 358-359. [2 refs.]

III. VAN DEINSE, F. (1932). Sur le sort éloigné de Cobayes inoculés avec de l'ultravirus tuberculeux et du BCG. [**The Ultimate Fate of Guinea Pigs inoculated with the Virus of Tuberculosis and with BCG**].—*Ibid.* 373-375.

IV. NÈGRE, L., & VALTIS, J. (1932). Contribution à l'étude expérimentale du Bacille bilié de Calmette et Guérin (BCG). [**Contribution to the Experimental Study of BCG**].—*Ann. Inst. Pasteur.* **49.** 595-607. 3 figs. [8 refs.]

I. There is considerable clinical data proving that the tuberculin reactions in infants inoculated with BCG are different from those resulting from natural tuberculous infection. Saenz reports that experiments on guinea pigs have shown that BCG is capable of causing a lasting sensitiveness of the skin which would appear to indicate that the vaccine is able to multiply in the animal system.

II. Vandestrate has shown that virulent tubercle bacilli inoculated subcutaneously into guinea pigs, previously inoculated with BCG, are excreted with the bile.

III. van Deinse found that guinea pigs inoculated with the filtrable form of the tubercle bacillus and allowed to live for long periods (up to 664 days) did not show any lesions of tuberculosis on autopsy.

IV. Nègre and Valtis bring forward further evidence in support of the innocuity of BCG.—T. M. Doyle.

I. Feldman, W. H. (1932). **A Study of the Pathogenicity of the Bacillus of Calmette-Guérin (B.C.G.).**—*Amer. J. Path.* **8.** 755-767. 4 figs. on 2 plates, 2 tables. [17 refs.]

II. Feldman, W. H. (1932). **A Study of the Pathogenicity of the Bacillus of Calmette-Guérin (BCG).**—*Ibid.* **8.** 629. [Paper presented at the 32nd Annual Meeting of the American Association of Pathologists and Bacteriologists].

I. A deliberate attempt was made to increase the pathogenicity of a strain of BCG obtained from Calmette by subculture on glycerine-egg every 30 days for a period of 15 months. From each subculture four guinea pigs were inoculated —two intracerebrally, one subcutaneously and one intraperitoneally. All were examined by histological and cultural methods, no lesions being accepted as tuberculous unless acid-fast bacilli were detected. Of 58 guinea pigs inoculated, 11 showed lesions which were histologically typical of tuberculosis and from which cultures of acid-fast bacilli were obtained. None of these showed gross evidence of tuberculosis. In nine the inoculation had been intracerebral, in one intraperitoneal and in one subcutaneous. Attempts to raise the virulence of the strain by passage failed.

It is concluded that the strain of BCG is not devoid of pathogenicity for guinea pigs, but that the presence or absence of tuberculous lesions depends upon the individual susceptibility of the animal.

II. This is a report on the work reported in I, presented to the Meeting of the American Association of Pathology and Bacteriology.—A. W. Stableforth.

Hagan, W. A., & Levine, P. (1932). **The Pathogenicity of the Saprophytic Acid-Fast Bacilli.**—*J. Amer. Vet. Med. Ass.* **81.** 723-733. 2 figs., 3 tables. [8 refs.]

Acid-fast bacilli suspended in mineral oil were inoculated subcutaneously, intramuscularly and intraperitoneally into guinea pigs, three animals being used for each suspension and each animal receiving one injection. Seventeen different cultures were used :—*Mycobact. graminis*, *M. smegmatis*, *M. lymphangitidis*, *M. stercusis*, *M. phlei*, *M. berolinensis*, *M. leprae* (2 strains), *M. chelonei*, *M. ranae*, *M. paratuberculosis*, *M. tuberculosis* (avian) and *M. tuberculosis* (bovine). The pathogenic organisms were heat-killed.

Eleven out of 51 animals died as a result of the injection : the others were killed after two to three months. The first death occurred on the sixth day. With two exceptions, all the animals that died were those which had been inoculated intraperitoneally. Sero-fibrinous peritonitis, with numerous bacilli in the fibrinous masses, was found in the animals dying after a few days. Definite tubercles were present on the peritoneum of guinea pigs which lived longer. Granulation tissue usually appeared in the great omentum and often on the surface of the liver, sometimes infiltrating the latter organ. The spleen frequently became adherent to the parietal peritoneum. Foci of pus formation usually occurred in the granulation tissue and sometimes in the spleen pulp. Occasionally, large abscesses appeared between the intestinal loops and elsewhere. All these animals rapidly became emaciated.

Local abscess formation and often caseation of the associated lymph glands followed intramuscular and subcutaneous injection. The abscesses rarely burst.

In 41 of the animals, lung lesions, varying from isolated tubercles to complete

necrosis, developed. Every culture caused lung lesions in at least one animal. Bacilli were readily demonstrated by culture and staining in the early lesions. Older lesions presented more difficulty and some were negative. Except when the injection was intraperitoneal, none of the viscera, other than the lungs, were involved.

In a second experiment, *M. phlei* and heat-killed avian tubercle bacilli were suspended in butter fat and inoculated intramuscularly into guinea pigs. Saline suspensions of the same organisms were injected into controls. Lung lesions developed in all the animals which received the butter fat suspension, but not in the controls.—GEORGE SLAVIN.

BENDIXEN, H. C. (1933). Untersuchungen über die in aseptisch entnommenen Milchproben vorkommenden Korynebakterien (Euterkorynebakterien). [**Investigations into Corynebacteria (Udder Corynebacteria) occurring in aseptically-taken Milk Samples**].—*Zschr. Infektkr. Haust.* **43.** 106-124. 2 tables. [19 refs.]

Bendixen performed a thorough bacteriological examination of 288 aseptically-taken milk samples from 73 cows with apparently healthy udders. 31·9 per cent. of the samples contained streptococci, 13·9 per cent. micrococci, 23·3 per cent. corynebacteria, 4·2 per cent. streptococci and micrococci, 4·5 per cent. streptococci and corynebacteria, 0·7 per cent. micrococci and corynebacteria, 2·8 per cent. *Br. abortus* and 18·4 per cent. of the samples proved either to be free from organisms or to contain very few.

Cultures were made on slant serum agar and incubated in a carbon dioxide atmosphere for three to four days.

The microscopic examination of the sediment of 253 samples revealed corynebacteria in 7·9 per cent. The corynebacteria proved to be Gram-positive, but they did not withstand long treatment with alcohol ; they were acid-fast and some of the organisms could not even be discoloured by 25 per cent. sulphuric acid. The author points to the fact that such corynebacteria cannot be distinguished morphologically from *Mycobact. tuberculosis*. Corynebacteria could be demonstrated in milk from apparently healthy udders as well as in that from typical mastitis cases due to a streptococcal infection.

Comparative cultural tests revealed such uniformity of character in 71 (92 per cent.) of the strains isolated that the author considers them to be a special type. These strains grew slowly at room temperature and developed a typical zone of growth in ordinary shake agar cultures. Six strains of corynebacteria growing aerobically showed marked differences from each other. Three strains grew very well at room temperature and two of them showed great similarity with strains of corynebacteria isolated from market milk.

The corynebacteria were not virulent for rabbits, guinea pigs or mice.

The injection of corynebacteria into rabbits resulted in the formation of complement-fixing antibodies.—R. WETZEL (HANOVER).

WATSON, W. R. (1932). **Preisz-Nocard Bacillus Infection in Cattle.**—*Vet. Rec.* **12.** 1486-1488. [Paper presented to the Mid-West and South Wales Division, National Veterinary Medical Association, 1932].

The author describes clinical lung and heart symptoms in a first-calf Guernsey heifer which on slaughter exhibited a tumour-like growth as large as a walnut on the left ventricular endocardium. The growth had the consistency of rubber and on section showed a yellow glistening surface. The laboratory examination resulted in finding the Preisz-Nocard bacterium. A second case was observed by

the same author in a Friesian heifer and the laboratory examination gave a like result. Three cases were observed in all within a period of six weeks, though the author had not met with a case before. In the course of the discussion which followed, GOLLEDGE reported what he believed to be another similar case, with a similar lesion in the heart.—S. H. GAIGER.

HINDMARSH, W. L., & BLUMER, C. C. (1932). **Infectious Abortion of Sheep : Preliminary Report.**—*Austral. Vet. J.* **8.** 149-151. 1 table.

Of a flock of 4,000 Merino sheep in New South Wales, 120 aborted and of these 30 died from septic metritis. From the uterus of one of the ewes which aborted a diptheroid bacillus was cultivated. Intraperitoneal inoculation of a suspension of the organism yielded no result in a male guinea pig, but was followed by abortion in two pregnant guinea pigs within 24 hours of infection. Intravenous inoculation produced a similar result with pyaemia of the liver followed by death in six days. Vaginal swabbing of a pregnant guinea pig produced abortion in 11 days. Pyaemia of the liver was produced after intravenous inoculation of a rabbit and premature birth with death of the lamb in a pregnant ewe. A purulent discharge was also produced in a ram by swabbing the sheath with a culture. The organism was recovered from the uterus or other organs of the experimental animals. The authors mention *Vibrio foetus*, *Bact. abortus ovis* and a member of the brucella group as other causes of abortion in sheep in other parts of the world.
—R. LOVELL.

VAN HEELSBERGEN, T., & CLARENBURG, A. (1932). Apathogene diptheriebacillen bij het kalf. [**Non-Pathogenic Diphtheroid Bacteria in a Calf**].—*Tijdschr. Diergeneesk.* **59.** 1044-1047. [Summaries in English, French and German : abst. from orig.]

A pure culture of a diphtheroid organism was isolated from the blood of a young calf which had suckled a cow with sore teats.

As many cases of human diphtheria occurred in the neighbourhood, it was considered advisable to determine whether the organism encountered was *Corynebacterium diphtheriae*. After a thorough examination it was proved that this was not the case.

The organism was non-toxic and non-pathogenic for guinea pigs and calves.
—B. J. C. TE HENNEPE (ROTTERDAM).

I. OKUDA, K., TOYOSHIMA, T., MOCHIDA, I., SATO, Y., & IJICHI, S. (1932). **An Unusually Severe Outbreak of Glanders in South Manchuria.**—*Orig. Contrib. Mukden Inst. Infect. Dis. Anim.* **2.** 17-26. [Summary in English (p. 231) : abst. from authors' summary].

II. TOYOSHIMA, T., OKUDA, K., MOCHIDA, I., & IJICHI, S. (1932). **On the Variant Types of Bacillus mallei. I. Transformation, Morphology of Colony and Bacterial Cell, Cultural Behavior, Virulence of Types.**—*Ibid.* 27-47. [Summary in English (p. 233) : abst. from authors' summary].

III. NAIK, R. N. (1932). **Agglutination Reaction due to Mallein Injections in Horses.**—*Ind. J. Vet. Sci. & Anim. Husb.* **2.** 265-273. 2 tables. [4 refs.]

IV. NAIK, R. N. (1932). **Agglutinability of Different Strains of** *Bacillus mallei*.—*Ibid.* 274-275. 1 table. [1 ref.]

I. An outbreak involving 778 military horses, of which, in the course of one to two months, over 200 died and over 200 more became infected. Farcy was rare, nearly every case being respiratory infection. Of the survivors, 208 horses, or 36·5 per cent. reacted to the ophthalmic mallein test. 92·1 per cent. of

the sera of these reactors gave a positive complement-fixation test, and 99 per cent. agglutinated *Pfeifferella mallei* antigen to a titre of over 1 : 800. The authors diagnosed 198 animals as infected and 5 as suspected ; 33 positive animals were killed and all showed lesions and gave positive cultures.

II. Blaimschein has distinguished smooth (S), rough (R) and corrugated (C) types of *P. mallei* colonies. The authors examined 155 strains obtained from 83 horses affected with glanders and have arrived at the following conclusions :—

(1) First cultures are limited to the S type ; mutation to the R and C types can be obtained by subculture on suitable media.

(2) The S type. Fixation of this type by repeated isolation is difficult, there always being a tendency to revert to the R form. Reversion of S to C can be obtained by cultivation for about 30 days in acid glycerine broth.

(3) The R type. Fixation is easy ; reversion on glycerine agar cultures never occurs. It can be made to revert to S, in the majority of cases, by prolonged cultivation in acid glycerine broth (65 days). C and RC colonies can also be obtained by this means. Reversion also obtains *in vivo*.

(4) The C type readily reverts, especially to the S form.

(5) Morphologically, the S type is typical *P. mallei*, and C colonies are almost the same. R type bacilli, however, occur as chains or filaments (two exceptions).

(6) Culturally, glycerine appears to be necessary for differentiation. In acid glycerine broth the C type alone grows as a corrugated pellicle.

(7) The S form is the most virulent, and the R form the most attenuated.

III. The subcutaneous injection of mallein may confuse the issue of a confirmatory serological test. The author has shown that agglutinins do not persist for more than about two months after mallein injection, and that repeated mallein injections do not raise the titre after the first week ; agglutinins do not persist longer than three weeks after the last injection.

IV. Working with three stock strains of *P. mallei* with slightly different cultural characteristics, the author failed to find any variation in agglutinability.

—Norman Hole.

Jorge, R. (1933). Summa epidemiologica de la peste épidémies anciennes et modernes. [**Epidemiological Summary of the Plague. Ancient and Modern Epidemics**].—*Bull. Off. internat. Hyg. publ.* **25.** 425-450. 3 figs. on 2 plates. [10 refs.]

This is a masterly summing up of our knowledge of plague from the most ancient times down to our own day. The author shows that though Europe has suffered from two distinct cycles of plague—the one reaching its zenith in the middle ages and disappearing in the eighteenth century and the other a quite recent recrudescence—the latter only differs from the former in that it is not quite so widespread in its dissemination. The plague described by Procopius of Caesarea as invading Byzantium in the sixth century, the " black death " of the fourteenth century, and the Eastern Europe outbreak of this century are one and the same disease. There are two types, the bubonic and the pulmonary, but both are due to the same bacillus. The mode of spread is from rat to flea and from flea to man, though plague, especially the pulmonary type, is also transmissible from man to man.

Formerly the plague followed the great trade routes. Caravans contaminated in Mesopotamia brought plague to Venice, and thence the disease was radiated in every direction. The decline of Venetian trade coincides with the decline of the first cycle of the plague. Modern sanitation is no doubt one of the causes of

the diminution in the rapidity and extent of spread of the modern outbreak. The author is, however, not sanguine that, though we have now reached a comparatively quiescent stage, there will not be further outbreaks.—F. Bullock.

Parker, R. R., Philip, C. B., & Davis, G. E. (1932). **Tularaemia : Occurrence in the Sage Hen.**—*Publ. Health Rep. Washington.* **47.** 479-487. [15 refs.]

Investigations into an epizootic amongst sage hens resulted in the recovery of *Pasteurella tularensis* from the tissues of these birds. Some of these sage hens were heavily infested with the tick *Haemaphysalis cinnabarina* and guinea pigs injected with suspensions of these ticks died from tularaemia. Three cases of human infection with *Past. tularensis*, following accidental injury to skin with bones of game birds, are reported.—H. G. Lamont.

Heymann, B., & Kyriasides, K. (1933). Ein bisher nicht beschriebener, für Meerschweinchen pathogener Bacillus aus der Gruppe der bipolaren Septicämieerreger. [**A New Guinea Pig Pathogen of the Pasteurella Group**]. —*Zschr. Hyg. u. Infektkr.* **114.** 116-120. 1 table. [9 refs.]

The authors describe a disease in guinea pigs caused by an apparently new organism of the pasteurella group. The infected animals showed oedema of the abdomen, usually restricted to one side and the corresponding hind limb : death occurred within a few days. Morphologically the organisms occurred in clumps and were oval or rod-shaped in appearance. Cultural and biological tests showed the following differences from "*B. bipolaris septicus*" :—In broth a pellicle at the surface ; there was growth on potato ; milk was coagulated ; colonies on endo-agar were red. The organisms were not virulent for the rabbit ; inoculation of cultures into guinea pigs and mice, however, produced an oedematous condition followed by death. The authors suggest the name "*Bacillus bipolaris* der malignen Meerschweinchen-Phlegmasie."—R. Wetzel (Hanover).

Bisbocci, G. (1932). Su Alcuni casi di aborto infettivo delle cavalle. [**Cases of Contagious Equine Abortion**].—*Clin. Vet. Milan.* **55.** 259-269. [53 refs.]

The author gives brief details of his tests with sera from mares that had aborted in four studs.

The organisms used for the agglutination tests were cultivated from foetuses, but no indication of the density of the suspension is given. It would seem that in the majority of cases—ten sera in all from aborted mares were tested—agglutination did not occur in dilutions higher than 1 : 100, while in some instances it was doubtful at 1 : 50.—A. Leslie Sheather.

I. Standfuss. (1932). Kommt der Paratyphus des Menschen bei Tieren vor ? [**Does Human Paratyphoid occur in Animals ?**]—*Tierärztl. Rdsch.* **38.** 33-34.

II. Clarenburg, A., & Dornickx, C. G. J. (1932). Nahrungsmittelvergiftung bei Menschen in Zusammenhang mit Taubenparatyphose. [**Food Poisoning in Man associated with Pigeon Paratyphoid**].—*Zschr. Hyg. u. Infektkr.* **114.** 31-41. 7 tables. [13 refs.]

I. Speaking on this subject, the opinion is expressed that the human type of paratyphoid bacillus is less virulent for bovines than for human beings. *Bact. enteritidis* (Gaertner's bacillus) is rather more virulent for bovines. The opinion is based on the attempt made to transmit to calves *Bact. paratyphosum* B from clinically healthy cows which were apparently excreting the organism ; the results were negative. A similar attempt with *Bact. enteritidis* produced a disease similar

to calf diarrhoea in two of four cases. [The generally accepted opinion is that the human pathogen *Bact. paratyphosum* B is never found in animals, although other members of the group, including *Bact. enteritidis*, *Bact. aertrycke* and the Dublin type may cause disease in bovines].

II. Twenty persons suffered from acute gastro-enteritis after partaking of a pudding in the making of which 100 pigeons' eggs had been used. From the pudding was isolated a bacterium which by cultural, biochemical and serological tests appeared to be identical with *Bact. aertrycke*. The organism was pathogenic for mice and pigeons by subcutaneous inoculation. Similar bacteria were isolated from the faeces, blood and urine of a number of the patients. Certain of the patients subsequently showed agglutinins for *Bact. aertrycke* in their blood serum. These agglutinins could be absorbed by *Bact. aertrycke*, and by the strains isolated from the pudding and the patient.

Bact. aertrycke was isolated from two of seven samples of faeces taken from the pigeon-loft and from the faeces of three of the birds, two of which had agglutinins for *Bact. aertrycke* in their blood serum. Similar bacteria were isolated from the tissues of a dead pigeon and from six of 200 eggs examined. The authors believe it to be the first record of human infection from pigeons infected with a member of this group of bacteria.—R. Lovell.

Seidel, G. K. (1932). Beitrag zur Bekämpfung der bazillären Kükenruhr. [**The Control of Bacillary White Diarrhoea of Chicks**].—*Münch. tierärztl. Wschr.* **83.** 613-616. 5 tables.

The most interesting point in connection with *Bact. pullorum* infection is the problem of the carrier hen. The author gives the history of 40 reacting hens showing no evidence of the disease. The agglutination test was performed at the age of 11 months. The reactors were kept under special hygienic conditions and iodine was added to the daily ration. During 12 months no losses due to *Bact. pullorum* infection occurred among these hens. The laying activity, the hatchability of the eggs and the viability of the chicks did not appear to be decreased as compared with non-reacting controls. Comparative tabular statements are given.

With reference to these results the author believes that the hens had recovered from the infection and showed only low titre agglutinins in the blood at the time of the test. In this connection the limited value of the agglutination test is discussed. Iodine is believed to have a good effect on the egg production and the hatchability of eggs as well as on disease resistance.—R. Wetzel (Hanover).

—. (1933). **Report of Committee on Bang's Disease.**—*J. Amer. Vet. Med. Ass.* **82.** 335-344.

The following recommendations made by the committee are of interest :— that, in applying the agglutination test to the diagnosis of *Br. abortus* infection, complete agglutination in a dilution of 1 : 25 or partial agglutination in 1 : 50 should be regarded as suspicious ; that uniform methods of testing should be adopted ; that regulations for the interstate movement of cattle should be made uniform and that measures of control should be made to conform to conditions existing in each state.

The committee desires in particular to warn against any unusual restrictions on the movement of cattle within the state. It also sounds a note of warning to states which enforce regulations upon the introduction of infected cattle without controlling the disease within the state.—R. S. Roberts.

Taylor, R. M., Lisbonne, M., & Roman, G. (1932). Recherches sur l'identification des *Brucella* isolées en France par l'action bactériostatique des matières colorantes et la production d'hydrogène sulfuré (Huddleson). [**The Identification of Strains of *Brucella* isolated in France by the Dye Tolerance Tests and the Production of Hydrogen Sulphide**].—*Ann. Inst. Pasteur.* **49.** 284-302. 4 tables. [12 refs.]

The authors give a brief description of the methods employed in differentiating the types of brucella. The methods they themselves have used in the study of 191 strains are :— (1) tolerance to dyes, especially thionin and basic fuchsin ; (2) production of hydrogen sulphide and (3) sensitiveness to carbon dioxide which they point out is only applicable to freshly isolated strains.

The strains were of human, bovine, caprine, ovine and equine origin. Those which tolerated basic fuchsin and thionin were classified as *Br. melitensis* and those which grew on basic fuchsin media but were inhibited by thionin were classified as *Br. abortus*. 187 of the 191 strains were classified by this method, whilst four were atypical. 179 of them agreed in hydrogen sulphide production and dye tolerance ; the other eight strains were classified as *Br. abortus* because of their origin, and their reactions to the dye test. Of the remaining four strains, three were inhibited by both thionin and basic fuchsin, the other tolerated both dyes. All four of them produced hydrogen sulphide for only 24 hours and not for two to four days. The former is characteristic of *Br. melitensis*, the latter *Br. abortus*, but because of their origin and their need for or better growth in an atmosphere of carbon dioxide they were classified as *Br. abortus*.

The results of the studies show that of 131 human strains, 129 were *Br. melitensis* and two *Br. abortus*. One of the latter was isolated from a cattle dealer and the other from a farmer who owned cattle, a proportion of which had aborted during the previous year. Of 41 bovine strains, 38 were *Br. abortus* and three *Br. melitensis*, the latter from bovines in the vicinity of infected flocks of sheep. Of ten ovine strains, nine were *Br. melitensis*, and one *Br. abortus*, the latter from a sheep in an area in which bovine abortion was common. Six caprine strains were classified as *Br. melitensis* and three equine strains as *Br. abortus*.

Geographically it appears as if *Br. abortus* predominates in the north and west of France and *Br. melitensis* in the south and certain eastern areas.

—R. Lovell.

I. Silberstein, W. (1932). Zum kulturellen Nachweis des Bacillus abortus Bang beim Menschen. [**A Cultural Method for the Detection of *Br. abortus* in Man**].—*Zschr. Hyg. u. Infektkr.* **114.** 177-178. [4 refs.]

II. Lentz, W. (1932). Ein Schutzmittel gegen Abortus-Banginfektionen der Tierärzte. [**A Prophylactic against *Br. abortus* Infection in the Veterinarian**]. —*Berl. tierärztl. Wschr.* **48.** 166.

I. The following method was used in an attempt to cultivate *Br. abortus* from the blood of patients suspected to be suffering from undulant fever.

A flask containing 60 c.c. of meat infusion broth was inoculated with a small quantity of the patients' serum and a stream of carbon dioxide allowed to pass over the surface of the medium for one to two minutes, after which the plug was covered with a paraffin layer. The flask was incubated for three days, the growth plated in agar and cultivated in a carbon dioxide atmosphere.

From only three of 117 patients, whose sera gave positive agglutination reactions, could *Br. abortus* be recovered by this method.

II. An ointment called " desitinsalbe " is recommended for use by veterinarians as a protective for the arms before removing the foetal membranes from

cows that have aborted. It is composed of cod liver oil, zinc oxide, chlorine, lanoline and vaseline ; it possesses the advantage that it does not liquefy at body temperature and is non-irritant.—S. J. Edwards.

Wilson, G. S. (1932). **Latent Brucella Infections in Veterinarians.**—*Vet. Rec.* **12.** 1240-1245. 5 tables. [24 refs.]

Blood from 98 veterinarians was collected at the Folkestone Congress of the National Veterinary Medical Association, 1932. The serum of 15 out of 63 who had been exposed to contact with aborting animals agglutinated *Br. abortus* or *Br. melitensis* to a titre of 1 : 20 or over, the highest titre being 1 : 220. Amongst 35 who had no such contact only one positive result was obtained, a titre of 1 : 40 in a laboratory worker who was constantly handling living *Br. abortus.*

These figures are compared with those of other workers and the conclusion is reached that veterinarians, slaughterers and farm workers frequently become infected with *Br. abortus* but that the infection usually remains latent. The bearing of the presence of antibodies in the blood of latently infected persons is discussed in its relation to diagnosis of undulant fever.

Of 46 veterinarians who had engaged in " cleansing " during the preceding two years, 16 gave a history of an arm rash. Tentative agreement is expressed with the view of Huddleson and Johnson that this rash is a cutaneous hypersensitiveness resulting from a previous existent infection with *Br. abortus.* [See this *Bulletin.* **3.** 294 and 313].—A. W. Stableforth.

Hassan, S. R. (1933). **A Study of Undulant Fever in the Punjab caused by Brucella abortus (Bang).**—*Arch. Schiffs- u. Trop.-hyg.* **37.** 121-130. 6 tables. [26 refs.] [Orig. in English].

The writer observes that undulant fever is very common in the Punjab and he attributes this to the very close association which exists between a large proportion of the population and domesticated animals.

Cattle are stated to be responsible in no less a degree than goats for the transmission of infection to human beings. This statement is supported by the results of agglutination tests with 553 samples of human blood serum, 565 samples of goat serum and 751 samples from cattle. In all cases the sera were tested against both *Br. melitensis* and *Br. abortus* antigens.

Efforts to find a bacteriophage against organisms of the genus *Brucella* were not successful.—Gwilym O. Davies.

I. Balozet, L., & Reynal, J. (1932). La fièvre ondulante d'origine bovine à Tunis. [**Undulant Fever of Bovine Origin in Tunis**].—*Arch. Inst. Pasteur, Tunis.* **21.** 273-275.

II. Home, W. E. (1933). **The Migration of " Malta Fever."**—*Lancet.* **224.** 275-276. [4 refs.]

I. As the incidence of *Br. melitensis* infection may be as high as 33 per cent. in goat flocks in Tunis, it has always been assumed that human infection was entirely attributable to this source. In recent years human cases have been encountered which could not be traced to the consumption of goats' milk. An epidemiological study was made of 149 cases detected in the first six months of 1932 and of these 35 affirmed that they had never consumed milk or cheese of caprine origin. The source of the cows' milk partaken of was traced in 11 of these cases. Four of them had obtained milk from the same farm, and of 37 bovines on this farm 26 gave reactions of 1 : 50 or higher to the agglutination test

[presumably *Br. abortus*]. Bacteriological study of organisms isolated from these animals is not yet complete.

II. The author advances the view that Malta fever was new to Malta when first heard of in the fleet in 1856. He attributes its introduction to an expedition to South Russia during the Crimean War. No definite evidence is adduced.

—R. S. Roberts.

Duff, H. M. (1933). **Brucella Abortus in the Horse.**—*J. Comp. Path. & Therap.* **46.** 42-46. [24 refs.]

Several instances have been recorded in America and on the Continent of the isolation of *Br. abortus* from lesions in the horse and particularly in the fluid from abscesses in cases of " poll evil " and fistulous withers. In Germany during the war the sera of 3,419 horses were tested against *Br. abortus* and of 17 which reacted positively to the agglutination test 12 were affected with fistulous withers. In France 15 cases of " poll evil " and fistulous withers were similarly tested and of these 12 gave a positive reaction, the organism being isolated from two reactors. In America, McNutt and Murray (1924) claimed to have isolated the organism from an aborted equine foetus. The association of *Br. abortus* with " poll evil " and fistulous withers has also been recorded by Bennetts and Filmer (1931) in Australia, and by Hutten (1931) and Magnusson (1932) in Sweden.

Duff now describes an organism isolated in pure culture from a withers abscess in a horse, indistinguishable microscopically, culturally and serologically from *Br. abortus*. It is noted that this animal had been pastured on common land on which abortions in cattle had frequently occurred.—Ll. E. W. Bevan.

Carlier, A. (1932). La brucellose bovine—son diagnostic. [**Bovine Brucella Infection—Its Diagnosis**].—*Thesis for Docteur vétérinaire, Alfort.* pp. 123. [128 refs.]

The author describes in detail the methods of diagnosis applicable to brucella infections in bovines. These include clinical and bacteriological examination, animal inoculation, complement-fixation, agglutination and the intradermal test. Importance is attached to the last named.—R. S. Roberts.

Makkawejsky, W. N., & Karkadinowskaja, I. A. (1932). Ueber die Empfindlichkeit der Katzen gegen Brucella melitensis-abortus. [**Susceptibility of Cats to Brucellosis**].—*Deuts. tierärztl. Wschr.* **40.** 229-231.

The authors tested the pathogenicity of 16 *Br. abortus* strains on 16 cats and in addition a few of them were given *melitensis* strains. They found cats to be susceptible to brucella infection : the cats reacted by the production of agglutinins ; most of them remained in apparently perfect health, but five showed general symptoms of ill-health and two died.

Technical details are given in the original.—J. E.

Gill, D. A. (1933). **The Effect of Brucella abortus Infection on the Normal Udder of a Healthy Cow.**—*Vet. J.* **89.** 159-165. 2 tables.

The author records the results obtained from the inoculation of 5 c.c. of a heavy suspension of a recently isolated strain of *Br. abortus* into the mammary vein of a normal cow. The cow had had three calves and was not in calf at the beginning of the experiment, but was served and conceived three months later.

Following inoculation the blood serum gave a positive agglutination reaction on the twelfth day and remained positive from then onwards without much fluctuation in titre. *Br. abortus* appeared in the milk and persisted there throughout

the subsequent lactation period, but whey agglutination tests proved consistently negative.

About three months after the original inoculation 4 c.c. of a heat-killed saline suspension of *Br. abortus* was injected into the right hind quarter through the teat canal. Apart from setting up a streptococcal mastitis, it had no appreciable effect upon the abortion infection and no agglutinins occurred in the whey.

The cow was slaughtered at the end of the lactation period [presumably about twelve months after the intravenous inoculation of the *Br. abortus*]. The udder and supramammary lymphatic glands were normal in appearance. Culture of the supramammary glands for *Br. abortus* gave negative results. Microscopical sections made from each quarter of the udder showed occasional small groups of lymphocytes and polymorphonuclear leucocytes in the interacinous tissue.

—T. M. Doyle.

I. Pröscholdt, O. (1932). Die Feststellung der Ausscheidung von Abortus-Bang-Bakterien mit der Milch. [**Determination of** *Brucella abortus* **Excretion in the Milk**].—*Deuts. tierärztl. Wschr.* **40.** 673-685. 7 tables. [19 refs.]

II. Karsten. (1932). Ueber das Vorkommen und den Nachweis von Abortus-bakterien in der Milch der Kühe. [**The Presence and Demonstration of** *Br. abortus* **in Cows' Milk**].—*Ibid.* 689-699. 10 tables. [4 refs.]

III. Klimmer, M. (1932). Abortus Bang und Milchhygiene. II. Mitteilung : Milchtiter, Züchtungs- und Tierversuche. [**Contagious Abortion and Milk Hygiene. II. Milk-Titre, Cultivation and Animal Inoculation**].—*Berl. tierärztl. Wschr.* **48.** 151-156. [38 refs.]

IV. Lerche. (1932). Welches Gemelk eignet sich am besten zum Nachweis der Abortus-Bang-Bakterien ? [**Which Part of the Milk is most Suitable for the Demonstration of** *Br. abortus* **?**]—*Tierarztl. Rdsch.* **38.** 279-281. 2 tables.

I. & II. The authors have investigated the relationship between the development of agglutinins in the blood and milk of cows affected with contagious abortion and the presence of *Br. abortus* in the udder.

From the results of the examination of 583 infected cows, Pröscholdt found that only 3 per cent. of cows with a blood agglutinin titre of under 1 : 100 excreted *Br. abortus* in the milk whereas, of those with a titre of 1 : 100 or over, 81 to 86 per cent. developed agglutinins in the milk to a titre of 1 : 10 or over. There was found to be a definite correlation between the concentration of blood agglutinins and the presence of *Br. abortus* in the milk. Thus of the cows with a serum titre of 1 : 100, 18 per cent. excreted the organism, of those with a titre of 1 : 200, 37 per cent. and of those with a titre of 1 : 400, 62 per cent. : finally, of those with a titre of 1 : 8,000, the figure was 100 per cent.

On account of the fact that agglutinins may sometimes exist in a higher titre in the milk than in the blood and that they may be confined to a single infected quarter, the author expresses the view that they are produced locally in the udder.

The methods for the cultivation of *Br. abortus* from milk by guinea pig inoculation and by cultural examination were practically the same as those used by Karsten. Pröscholdt found a close agreement between animal inoculation and the cultural method. Thus, of 163 infected milk samples, 145 were positive by the former test and 131 by the latter.

Regarding the public health aspect for the control of cows excreting *Br. abortus* in the milk, the author prescribes the following methods for their detection. By means of a preliminary blood test, the animals could be divided into two groups, one containing those with blood titres of under 1 : 100 which should be regarded

as non-excretors, and one containing those whose blood titres were 1 : 4,000 or over which should be regarded as excretors. From the animals with blood titres lying between those mentioned, a quarter milk sample should be examined for the presence of agglutinins. A titre of 1 : 80 or above would indicate infection of the udder while those with a lower titre should be submitted to cultural and finally biological examination.

Karsten found that, of 88 cows with a blood serum titre of 1 : 100, only 21 per cent. showed the organisms in the milk ; of 169 with a titre of 1 : 400, 64 per cent. Of 55 cows with a milk whey titre of 1 : 10, 25 per cent. excreted *Br. abortus* and of 159 cows with a titre of 1 : 40 or over, 64 per cent. A small number of animals gave no indication of agglutinins in the blood or milk although brucella organisms were recovered from the udder.

The most satisfactory method for demonstrating *Br. abortus* in the milk was found to be the inoculation of centrifuged deposit from mid-milk into guinea pigs. The rate at which specific agglutinins developed in the blood was found to depend on the number of organisms present and they might be present from two to four weeks after inoculation, at which time a titre of 1 : 40 was regarded as evidence of infection with *Br. abortus*. Animals showing no reaction at this time were examined four weeks later and a *post-mortem* examination made with a view to finding changes in the internal organs, especially the spleen.

The value of cultural examination was compared with guinea pig inoculation. The method used was to sow a small quantity of whole milk taken from the udder with sterile precautions on the surface of 15 per cent. serum agar plates containing 1 : 200,000 gentian violet. After incubation for a few days in a carbon dioxide atmosphere, the author regards the appearance of *Br. abortus* colonies as characteristic. Of 142 milk samples, *Br. abortus* was demonstrated by the guinea pig test in 104 cases, whereas by cultural examination only 40 were positive.

III. Klimmer found an association between agglutinin content of the blood and milk and the excretion of *Br. abortus* from the udder in much the same way as the two preceding authors, but their relationship was materially altered in the case of cows that had been vaccinated with living culture.

In unvaccinated herds the milk titres of cows excreting *Br. abortus* with the milk was 1 : 100 or over. In non-excretors this titre was never above 1 : 50. In vaccinated herds this ratio was upset, the milk titre of excretors varying considerably —from 1 : 25 upwards to 1 : 400 or over and that of non-excretors being in a few cases as high as 1 : 400.

In order to separate whey from milk, the addition of calcium chloride solution was found to enhance the action of rennet, while, for the cultural examination of milk, the addition of 1 per cent. boric acid was found to be of service in preventing the growth of contaminating organisms.

IV. The author compared the value of fore-, mid-, and strip-milk for the recovery of *Br. abortus* from infected milk by cultural methods and by guinea pig inoculation. Experiments showed that the best results were obtained with strip-milk. The author states that cultural examination is a very satisfactory method of detecting organisms in quarter milk, provided that samples are taken in a sterile manner.—S. J. Edwards.

Newsom, I. E., & Cross, F. (1932). **Further Observations on the Control of Contagious Abortion by Means of Blood-Testing and Segregation.**—*J. Amer. Vet. Med. Ass.* **81.** 195-208. 8 tables. [2 refs.]

During the course of eradicating abortion from a herd of cattle by blood testing and segregation, it was observed that some animals negative at the time

of abortion became positive at varying periods thereafter. Two such animals remained negative seven and nine months respectively after abortion and then became positive ; they had passed several tests and had been returned to the clean herd. It was considered that these animals were responsible for the waves of infection in the clean herd.

It is concluded that, during the process of eradication, it is unsafe to return negatively reacting aborters to the clean herd until at least one year has elapsed. —S. J. Edwards.

I. Thomsen, A. (1932). Weitere Versuche zur Immunisierung gegen ansteckendes Verwerfen der Kühe. [**Further Experiments on the Immunization of Cattle against Contagious Abortion**].—*Deuts. tierärztl. Wschr.* **40.** 595-598. [17 refs.]

II. Berthold, G. (1932). Betrachtung über Bang-Lebendkultur, -Vakzine, Farb- Impfstoff (Rakulin). [**Live Culture Vaccine and Dye-Vaccine in Bang's Disease**].—*Berl. tierärztl. Wschr.* **48.** 243-248. 3 plates, 4 charts.

III. Helms, T. (1932). Untersuchungen über spezifische Vakzination gegen Bang-Infektion bei Mäusen. [**Specific Vaccination against** *Br. abortus* **Infection of Mice**].—*Zschr. Immun.-Forsch.* **75.** 61-70. 8 tables.

I. The author describes two experiments which aimed at an effective method for immunizing cattle against contagious abortion.

In the first, an attempt to produce a high degree of immunity was tried by introducing vaccine into the uteri of heifers and allowing two months to elapse before service. The animals belonged to two infected herds and in one of these a living vaccine and in the other a dead vaccine was used. The results are not impressive on account of the small number of animals tested, but, as compared with the controls, there was a diminution in the abortion rate where living vaccine had been used.

The author suggests that the reason for the failure of vaccination in certain cases when it is practised in the usual way, i.e. when vaccine is administered two months before service, is that the immunity might have waned by the latter part of pregnancy with resulting abortion. In the second experiment 105 heifers from infected herds were injected subcutaneously with living culture one and a half months after service ; 62 heifers were used as controls. The results are not promising since 33 per cent. of the vaccinated animals aborted as against 27 per cent. in the controls.

II. Under the name of " rakulin," the author describes a specific soluble antigen prepared from *Br. abortus*. No precise details of its preparation are given except that it is obtained as a filtrate from bacteria which have been grown on a solid medium. The antigen reacts specifically with a *Br. abortus* immune serum prepared from rabbits. Further, it is capable of producing agglutinins to the same titre as living *Br. abortus* after injection into rabbits.

III. Helms' series of experiments on mice showed that a useful protection against *Br. abortus* could be conferred by a preliminary subcutaneous injection of dead organisms. The degree of protection as far as could be judged from the generalization of the organisms in the tissues was found to be dependent on the dose of dead organisms used for vaccination and on the subsequent dose of living organisms.—S. J. Edwards.

Laja, F. (1932). Märkusi veiste nakkava nurisünnituse (Abortus Bangi) vastu voitlemise määruse kohta. [**Comments on the Law concerning the Control of Contagious Abortion**].—*Eesti Loomarst. Ring.* **8.** 139-141.

—. (1932). Veiste nakkava nurisünnituse (Abortus Bangi) vastu voitlemise määrus. [**Law concerning the Control of Bovine Contagious Abortion**].—*Ibid.* 161-162.

[Abst. from German abstracts by H. RICHTER (TARTU)].

Laja puts forward some critical comments on the details of the legislation on bovine contagious abortion in Estonia.

The relevant paragraphs of the regulations have been reproduced and form the subject of the second reference.—J. E.

I. VERDER, Elizabeth. (1933). **Rough and Smooth Variants of Cl. Welchii.**—*Proc. Soc. Exp. Biol. & Med. New York.* **30.** 547-548. [4 refs.]

II. WALBUM, L. E., & REYMANN, C. G. (1933). **The Production of Toxins by** *Clostridium welchii.*—*J. Path. & Bact.* **36.** 469-483. 12 tables, 2 charts. [14 refs.]

I. In the course of some work on the effect of varying gaseous mixtures and pressures on the growth of anaerobic organisms, the variants of two strains of *Cl. welchii* were studied. A description of the appearance of the colonies in agar and the growth in broth is given.

II. A study has been made of the best conditions for the production of the optimum amounts of toxin from *Cl. welchii.* Ordinary veal broth containing 1 per cent. peptone and 0·25 per cent. dextrose (pH 7·6 to 7·8 and medium covered with paraffin oil layer) was found to be most suitable. The addition of fresh muscle, meat, horse blood, phenanthrenchinon or of liver did not appreciably increase the value of the toxin produced. The addition of calcium carbonate to the medium was beneficial in neutralizing the acids formed.

When the most favourable conditions were provided for growth of *Cl. welchii*, the largest quantity of toxin was produced after cultivation for 10 to 11 hours at 37°C. and after 21 to 24 hours at 31°C. The toxin was most stable at pH 6.

The non-specific acute poisonous substance (Wassermann, Kojima) was not found in any quantity in broth containing up to 0·75 per cent. dextrose. It is produced in considerable quantities, however, when the dextrose content is increased to 2·25 per cent.

Observations have also been made on the optimum pH for the action of the proteolytic and gelatin-melting enzymes, which apparently play an important part in the production of the toxin of *Cl. welchii.* From the results of their investigations on these enzymes, the authors put forward suggestions regarding the production of this toxin.—A. J. WILSDON.

MCGAUGHEY, C. A. (1933). **The Separation from** *Clostridium welchii* **of Variants which differ in Toxicity and Antigenic Structure.**—*J. Path. & Bact.* **36.** 263-272. 2 plates, 4 tables. [13 refs.]

A study was made of two variants of *Cl. welchii*, the strain used being No. 273 in the National Collection of Type Cultures isolated originally from a case of gas gangrene. The variants were isolated by picking colonies or portions of them, direct subculture from agar to agar being mainly used. The parent strain and both variants liquefied gelatin and produced stormy fermentation in milk, but they all showed differences in form of colonies on agar, growth in broth, morphology of individuals, and in capsule and spore formation.

The parent culture gave colonies of a circular, glistening, creamy-yellow, non-granular appearance and buttery in consistence. Variant 1 had irregular, flat, rhizoid colonies with a filamentous edge. Variant 2 never became perfectly stable even after more than three years observation. Plated from agar to agar,

the colonies were inconstant in shape, some circular, others irregular; some opaque, others almost transparent. They were flat, smooth and of buttery consistency.

Variant 1 showed individual organisms as short slender rods or arranged as long filaments across the field of the microscope. Spore and capsule formation were absent. Variant 2 showed short rods resembling the parent form and pleomorphic forms.

Variant 2 produced three to six times as much toxin as the parent strain, but variant 1 produced little or no toxin. The variants differed from the parent in agglutination properties and were closely related to each other in this respect.
—S. H. Gaiger.

Gunnison, Janet B., & Coleman, G. E. (1932). **Clostridium botulinum, Type C, Associated with Western Duck Disease.**—*J. Infect. Dis.* **51.** 542-551. 6 tables. [14 refs.]

" Duck disease " causes a high mortality amongst wild ducks in the western states of America. Kalmbach in 1930 first suggested that this disease is botulism, and Hobmaier in the same year isolated *Cl. botulinum* type C from the tissues of wild ducks which had died of this disease. The authors have made a study of the duck disease organism, isolated from the liver tissue, comparing it with Graham's type Cα (American) from a horse, Seddon's type Cβ (Australian) from cattle and a South African strain of type Cβ from lamziekte carrion. The " duck disease" organism closely resembles other American strains of type Cα with which it was compared, morphologically, culturally, serologically and toxicologically. The duck strain toxin is very much more toxic when injected subcutaneously than when fed to laboratory animals, the ratio of the lethal dose by injection and feeding being for guinea pigs 1 : 1,800, for mice 1 : 22,500, and for rabbits 1 : 14,800. In ducks, however, the ratio is about 1 : 10 or 1 : 50. Chickens are very resistant, as it takes 4,000,000 guinea pig M.L.D. to kill a chicken by feeding. It was found that the duck organism grew well in sterilized mud from a lake shore, but no toxin was produced in this material. Ingested detoxified spores were harmless when fed to ducks.—S. H. Gaiger.

Wolters, K. L. (1932). Ueber die aktive Immunisierung gegen Tetanus mit Anatoxin. **[Immunization against Tetanus with Anatoxin].**—*Berl. tierärztl. Wschr.* **48.** 429-431. 3 tables. [7 refs.]

Ample opportunity was afforded the author for confirming the work of Ramon, Löwenstein and others who were able to demonstrate the immunizing value of anatoxin in the control of tetanus.

The preparation and standardization of the toxin are described. *Cl. tetani* was grown in broth medium which was tested repeatedly for its toxin content. When 0·0001 c.c. killed a 15 g. mouse in two to five days, 2 per cent. of formalin was added and incubation continued at 37°C. for 20 to 25 days. This was found to be sufficient time to render the toxin harmless.

The author carried out the following experiments with anatoxin. He found that a sheep would tolerate 50 c.c. and a horse 100 c.c. when given subcutaneously, with no ill effects. Mice when similarly inoculated with 0·2 to 0·5 c.c. were completely protected against 5 to 10 M.L.D. of tetanus toxin when tested four weeks later. Two horses which had been given two inoculations of 15 c.c. and 20 c.c. respectively withstood 50 to 100 M.L.D. three months later.

In an area where tetanus is enzootic and cases were of frequent occurrence, 180 horses were given two injections of 15 c.c. of anatoxin with satisfactory results.

The anatoxin retains its potency undiminished for at least a year when kept under cool conditions.—N. S. Barron.

Urbain, A., Davesne, J., Mennerat, M., & Bullier, P. (1932). Un cas de septicémie chez un éléphant marin, (*Macrorhinus leoninus L.*) dû au vibrion septique. [**A Case of Septicaemia caused by** *Vibrion septique* **in a Sea Elephant**].—*Bull. Acad. vét. France.* **5.** 413-415. 1 plate. [2 refs.]

The animal died after six days illness. The lesions were mainly haemorrhagic and involved the organs in the thoracic as well as in the abdominal cavity. In films of blood and of spleen and liver-pulp, Gram-positive rods with subterminal spores were found along with Gram-negative bipolar organisms. The authors considered that death was due to *Vibrion septique* and were uncertain as to its point of entrance into the tissues, unless through lesions caused by numerous ascarids which were present in the stomach and intestines. *V. septique* was identified by its cultural and immunological characters.—S. H. Gaiger.

Henke, A. (1932). Die nekrotische Leberentzündung (Bradsot) der Schafe in Chile. [**Necrotic Hepatitis (Bradsot) of the Sheep in Chile**].—*Wien. tierärztl. Mschr.* **19.** 527-528. [2 refs.]

The author investigated some cases of sudden death in sheep. In most cases the animals were ewes in good condition. Necrotic centres of small size surrounded by inflammatory zones were found in the livers.

It is briefly stated that an anaerobic organism was obtained from the diseased livers and that a further publication will contain an account of it, as well as of the histological changes and immunization experiments. It is not known how widely spread the disease is in Chile, or whether it causes serious losses.

—A. Leslie Sheather.

Dungal, N. (1932). **Vaccination against Braxy with Formalinised but Living Whole-Cultures.**—*J. Comp. Path. & Therap.* **45.** 313-316. 2 tables. [3 refs.]

The author, quoting Jensen, states that the total mortality amongst animals immunized against braxy was 2·02 per cent. out of 277,046 animals dealt with by various methods between 1897 and 1906. The mortality due to vaccination was 1·05 per cent.

After experiment it was concluded that formalin-killed whole cultures were lacking in immunizing stimulus and were too slow. A modified culture vaccine was prepared by adding 2·5 per cent. formalin to a 24-hour culture of *Clostridium septique*, and subsequently incubating again for 24 hours. This treatment rapidly decreases the toxicity of the culture without destroying its vitality. Precise details of the preparation and use of the vaccine are given. The paper concludes with a comparison of the older dried culture + serum and the new vaccination method ; it is shown that the new method has an increased efficiency, the loss among vaccinated animals in 1931 being 0·55 per cent., which was entirely due to braxy and in no way to vaccination—Edward F. Peck.

Brandenberg, T. O. (1932). **Lip-and-Leg Ulceration in Sheep with Report of Two Cases in Man.**—*J. Amer. Vet. Med. Ass.* **81.** 818-820.

A preliminary report is given of lip and leg ulceration in sheep ; this is followed by an account of a severe outbreak, in 500 sheep, which spread rapidly and involved cattle and possibly human beings. The spread of the disease was facilitated by the presence of Canadian thistle which was presumed to carry *Actinomyces necrophorus* on its barbs. Lesions in human beings developed between the elbow

and hand, and the knee and foot ; they were characterized by large lentil-like nodules which were slightly painful. There was a deep smarting or itching sensation when they were pressed or irritated and the local lymph glands were involved. A bacteriological examination revealed that a mixed infection was present and that in this infection was an anaerobe, the classification of which was not determined.—Edward F. Peck.

Gwan, O. S. (1932). Essais sur des cultures aérobies strictes dans le milieu anaérobie. [**Notes on the Growth of Strict Aerobes in Anaerobic Media**].—*C. R. Soc. Biol. Paris.* **111.** 500-502. [3 refs.]

Strict aerobes were found to be capable of growing in broth under anaerobic conditions, provided that the broth either contained some sugar which the organism was able to ferment or contained some of the bye-products of growth of a strict anaerobe.—H. G. Lamont.

DISEASES CAUSED BY PROTOZOAN PARASITES.

Michalik. (1932). Die Tilgung der Beschälseuche in Ostpreussen unter Dr. Marks. [**The Eradication of Dourine in East Prussia under Dr. Marks**].—*Berl. tierärztl. Wschr.* **48.** 610-611.

This article is an appreciation of the work of Marks written on his retirement and stresses the success of his handling of the dourine situation in East Prussia. The first cases of the disease were detected in October, 1908, previous to which the area had been free for 30 years. The action taken was to trace the history of the affected animals and of any animals which had been mated with them. Where centres of infection were discovered, observation areas were created in which all stallions and all mares over three years old were inspected once a fortnight and the keeping of registers of service was enforced. Animals mated with infected or suspected stallions or mares were not allowed to leave these areas. Other horses were only allowed to leave the area by permission of the police. All infected or suspected animals were slaughtered and compensation was paid to the owners. Seventy-nine animals were slaughtered and no further cases of the disease occurred after March, 1909.—U. F. Richardson.

Gurwitsch, B. M., & Subotnik, A. S.(1 933). Zum Studium des Beschälseuche der Pferde und der Komplementbindungsreaktion als diagnostischer Methode. [**On the Study of Dourine and the Complement-Fixation Reaction as a Method of Diagnosis**].—*Zschr. Infektkr. Haust.* **43.** 169-184.

This article deals with the study of dourine in the North Caucasus in 1927 to 1928. The local strain of *Trypanosoma equiperdum* varied from a laboratory strain in that it was less virulent to the horse, the incubation period being sometimes prolonged to nine months, and in that it was incapable of infecting white mice, white rats, guinea pigs or dogs.

Using the Zwick-Dahmen antigen of a watery carbolic extract of *T. equiperdum* obtained from rats or dogs, 10,000 tests of animals were made by the complement-fixation method. The test gave positive results in 84·2 per cent. of known infected animals and negative results in 99 per cent. of animals in which no infection was suspected. The test failed to detect in the incubation period and cases occurred in which positive and negative results were obtained from the same horse on different days. Sixty-three tests of the lipoid fixation reaction were carried out by the method of Meinicke-Dahmen. With this test, all known infected animals

gave positive results as did two animals in the incubation period, but 2 per cent. of apparently healthy animals also gave positive results.

Tests of the speed of the sedimentation of blood corpuscles by the methods of Westergren and Linzenmeyer were also made and gave encouraging results, but it is pointed out that positive readings are also given by animals affected with other diseases.—U. F. Richardson.

Nattan-Larrier, L., & Noyer, B. (1932). Le trypanosome du Débab Egyptien. [**The Trypanosome of Débab in Egypt**].—*Bull. Soc. Path. exot.* **25.** 563-569. [3 refs.]

The authors, working with a trypanosome strain from a case of débab in Egypt, point out a number of small differences in morphology and pathogenicity between it and strains from Morocco.

[The small differences described do not appear sufficient to warrant the assumption that the disease is due to a different trypanosome. If an investigation of a large number of strains showed that the trypanosomes from Egyptian cases could be regularly differentiated from the trypanosomes from Morocco, it would be necessary to consider them separate races].—U. F. Richardson.

Fine, J. (1933). **Is Trypanosomiasis in the Lactating Rat Transmitted to the Sucking Young?**—*Ann. Trop. Med. & Parasitol.* **27.** 180-181. 1 table.

Four healthy female rats in various stages of lactation were inoculated with equal amounts of citrated blood from a mouse dying of *Trypanosoma brucei* infection. All died of the infection within eight or nine days.

At the time that the mothers were inoculated, the litters varied in age from 6 to 43 days. After the death of the mother the youngest litter was placed with a foster mother, but was eaten. All of the remaining young, except one which died at the same time as its mother, were alive and well 14 days later. None of the young rats showed any evidence of infection.—J. R. Hudson.

Wormall, A. (1933). **Some Observations on the Value and the Mechanism of the Red-Cell Adhesion Test for Trypanosomiasis of Man and Other Animals.** —*Parasitology.* **25.** 64-76. 9 tables. [12 refs.]

Brown, A. F. (1933). **The Red Cell Adhesion Test in a Case of Trypanosomiasis.** —*Trans. Roy. Soc. Trop. Med. Hyg. London.* **26.** 471-472.

The first paper discusses the relationship between red-cell adhesion and platelet adhesion and stresses that the red cells must be those of a primate. With the red-cell adhesion test, a positive result indicates trypanosomiasis, but a negative result does not exclude the disease. To avoid non-specific adhesion several strains of trypanosomes should be used. It is advisable also to have a stock "adhesin serum" to ascertain whether the trypanosomes from any particular animal are capable of giving adhesion. In doubtful cases of trypanosomiasis, treatment with a trypanocidal drug results in marked improvement in the capacity of the serum or plasma to produce the phenomenon. Serum can be kept three weeks or more without appreciable loss of power if a small amount of phenol is added.

Experiments were also carried out to determine the amounts of adhesin and of the complement-like body which are required and it was ascertained that adhesin is non-dialysable and acts like a true immune body.

The second paper records that positive results were obtained with the red-cell adhesion test, after a provocative dose of tryparsamide, in a suspected case of sleeping sickness in which negative results had been given in daily examination of thick blood films and examinations of the cerebrospinal fluid and gland juice.

The positive reading was confirmed by the inoculation of a monkey and, later, trypanosomes were also detected in the blood of the patient.—U. F. Richardson.

Nicolle, P. (1933). Etude du pouvoir infectieux du sang et des organes des Souris expérimentalement infectées par *Trypanosoma congolense* pendant la période de blanchiment qui suit l'injection de différentes doses de 205 Bayer-309 Fourneau. [**A Study of the Infective Power of the Blood and Organs of Mice experimentally infected by *Trypanosoma congolense* during the Clean Period which follows the Injection of Different Doses of Bayer 205-Fourneau 309**].—*C. R. Soc. Biol. Paris.* **112.** 1658-1660. 1 table. [2 refs.]

A dose of 0·002 g. of the drug per 20 g. live weight clears the peripheral blood of trypanosomes for four to five days, but it was found that blood collected by cardiac puncture always proved infective on subinoculation. It appears, therefore, that trypanosomes must be still present in small numbers or in some cryptic form. Emulsions of various organs gave irregular results from which no conclusions could be drawn. With a dose of 0·004 g. of the drug per 20 g. live weight, it was shown that the blood was infective up to 23 hours, but after 31 hours the infecting power had been lost and was not regained until the third or fourth day. The results from organ emulsions were again irregular, but tended to agree with those from blood inoculation.—U. F. Richardson.

Johnson, P. D. (1933). **A Case of Infection by *Trypanosoma lewisi* in a Child.**—*Trans. Roy. Soc. Trop. Med. Hyg., London.* **26.** 467-468. 1 table, 1 chart.

This article records the infection by *T. lewisi* of a child in the Federated Malay States. The infection was associated with fever and anaemia and trypanosomes were present in large numbers in the peripheral blood for six days. The nature of the parasite was confirmed by Thomson and Wenyon. The child lived in a rat-infested house. Attempts to inoculate rats and guinea pigs and to cultivate the organism were all unsuccessful. Recovery occurred without treatment.

—U. F. Richardson.

Nattan-Larrier, L., & Noyer, B. (1933). Vitalité et résistance des Trypanosomes métacycliques. [**Vitality and Resistance of Metacyclic Trypanosomes**].—*C. R. Soc. Biol. Paris.* **112.** 1276-1279. [1 ref.]

Cultures of *Trypanosoma rabinowitchi* were prepared on rat-blood agar. After 48 hours in the incubator the water of condensation was removed and subjected to various physical and chemical agents. The liquid contained both leptomonal forms and metacyclic trypanosomes.

The physical tests consisted of exposure in the incubator for varying times to temperatures of 22°, 37°, 40° and 45°C., exposure to +4° and −14°C., and drying *in vacuo*. In all the exposure experiments the metacyclic forms survived longer than the leptomonal. Both forms were killed by desiccation.

Chemical experiments were made with the following reagents :—distilled water, 0·9 and 2·2 per cent. sodium chloride, 1·0 and 0·1 per cent. of decinormal sodium hydroxide, 0·1 per cent. of decinormal hydrochloric acid, 10 and 1·0 per cent. sodium oleate and 10 per cent. sodium taurocholate. Solutions of sodium hydroxide and sodium oleate dissolved the parasites rapidly. The weaker solution of sodium chloride and the sodium taurocholate had little harmful action. The acid destroyed both forms at the same time. The other solutions killed the leptomonal forms first.

Inoculation of the water of condensation into the peritoneum of mice showed

that the metacyclic forms withstood phagocytosis for a longer period than the leptomonal.—J. R. Hudson.

Falchetti, E. (1932). Observations sur la localisation cutanée des *Leishmania* chez les chiens dans le Midi de la France. [**Observations on the Localization of Leishmania in the Skin of Dogs in the Midi Area of France**].—*Bull. Soc. Path. exot.* **25.** 1036-1039. 2 figs. [1 ref.]

Giraud, P., & Cabassu, H. (1932). La leishmaniose canine dans la région de Marseille. [**Canine Leishmaniasis in the Neighbourhood of Marseilles**].—*Ibid.* 1040-1043.

Falchetti, E., & Brac, G. F. (1932). La Leishmaniose canine à Nice. Etude épidémiologique. [**Canine Leishmaniasis in Nice. Epidemiological Study**].—*Ibid.* 1091-1099. 5 tables. [11 refs.]

The first article records the difficulty in demonstrating leishmania in the cutaneous ulcers of dogs, whilst in the eczematous zones surrounding the ulcers they are present in large numbers in the hair follicles and in the sebaceous glands, which are infiltrated ; the parasites are found within histiocytes and fibroblasts, but never within the plasma cells. In the apparently normal skin surrounding the eczematous zone, the hair follicles show little alteration, but the sebaceous glands may show infiltration. Leishmania are frequently present yet there is no reaction round the elements which contain the parasites.

The second article deals with the type of canine leishmaniasis encountered near Marseilles which is chronic, nearly always fatal and does not yield to antimony treatment. The authors consider that skin examination is more satisfactory for diagnosis than spleen puncture or the trephining of long bones. Leishmania can be demonstrated by scraping the walls of ulcers, or, in the absence of an ulcer, by incising the diseased skin and examining the serum which exudes.

The third article records the results of the examination for leishmania of stray dogs destroyed at Nice and emphasizes how prevalent the disease can become without raising suspicion of its existence. 188 dogs were examined and 19·6 per cent. were found to be affected ; 19 of the affected animals showed no symptoms of disease and the presence of leishmania in the skin could only be demonstrated in three cases.

For examination *in vivo*, culture, examination of skin lesions, examination by liver puncture and trephining of bones was tried ; the latter proved most reliable, but only disclosed two out of three animals which were found affected on autopsy.

The formol-gel test proved unreliable and the deviation of the complement test, using an antigen of extract of liver or spleen rich in leishmania, gave uniformly positive results which could not be confirmed on *post-mortem* examination.

A modification of the Chopra-Gupta test using stibenyl instead of urea stibamine was tried in four cases and gave two negative and two positive results which agreed with the microscopic findings.—U. F. Richardson.

I. Sen, N. K. (1932). **The Antimony Test with Sera other than those of Kala-Azar.**—*Malaya Med. J.* **7.** 13-15. 1 table. [1 ref.]

II. Andre, Z. (1932). **Use of the Photometer "Vernes-Bricq-Yvon" for Avoiding some Causes of Error in the Diagnosis of "Kala-Azar" by the Reaction of Chopra and Gupta's Precipitation.**—*Ind. J. Med.* **13.** 5-6.

III. Ray, J. C. (1932). **Cultivation of Various Leishmania Parasites on Solid Medium.**—*Ind. J. Med. Res.* **20.** 355-367. 4 figs., 2 tables. [5 refs.]

I. A 4 per cent. solution of neostibosan was used for the test instead of urea

stibamine. Readings were considered positive if a heavy brownish flocculent precipitate appeared immediately at the junction of the serum and the antimony solution. Delayed precipitation was considered doubtful and a second test was made with the serum diluted 1:10. Out of 1,000 specimens examined, seven sera gave positive results, but five of the donors of these sera were apparently free from leishmaniasis and the other two could not be traced.

II. Attention is drawn to the confusion of the readings of the Chopra-Gupta test for kala-azar by the difficulty in distinguishing light precipitates from turbidity or from opalescence followed by precipitation. An attempt was made to overcome this by diluting the sera. Non-kala-azar sera lost their opalescent reaction to urea stibamine when diluted 1 : 500 whilst kala-azar sera showed opalescence at a dilution of 1:1,000. The author suggests diluting sera 1 : 1,000, putting 1 c.c. in each of two tubes and adding 0·1 c.c. of 1 per cent. urea stibamine to one tube. A difference of 15° by the Vernes-Bricq-Yvon photometer, between the two tubes, would indicate a positive reaction.

III. The author claims to have obtained an earlier development of leishmania in cultures (7 days instead of 10 to 12 days) by careful preparation of the medium and the use of a special culture tube with a bulge in which the water of condensation is allowed to collect.—U. F. Richardson.

Drescher, & Hopfengärtner. (1933). Der Trichomonadenabortus des Rindes. [**Trichomonad Abortion of Cattle**].—*Münch. tierärztl. Wschr.* **84.** 109-112. [9 refs.]

This article records the observations made on trichomonad infections in specimens from barren cows sent for bacteriological examination. Out of 655 specimens, 9 per cent. showed trichomonad infection, which appeared to be second to contagious abortion as a cause of sterility. A plea is put forward for practitioners to keep a careful watch for this disease and in this connection the main characteristics of the conditions are given. Cows suddenly cease to hold to service and this phenomenon is usually associated with the use of a new bull or after the home bull has served a strange cow. The mucous membrane of the prepuce and penis of the bull is usually inflamed and there may be a blood-stained exudation, whilst the animal is lazy in service. Abortion usually occurs between the 57th and 95th day of pregnancy though it may be delayed up to 190 days. The foetus and membranes show no pathological symptoms, but there is a pale anaemic appearance of the membranes and cotyledons. The uterine mucus has a glassy appearance and suspended in it are yellowish or yellowish brown flakes. There is no necrosis of the cotyledons and the uterine fluid is not purulent or brown as it is in *Br. abortus* infection.

To demonstrate the trichomonads the authors recommend the examination of fresh preparations under a magnification of 100. By adding a drop of 2 per cent. eosin the colourless trichomonads show up well against the coloured background. Later, movements diminish and under a magnification of 400 the parasites are seen as spherical structures which can be distinguished from cells, such as leucocytes, by their sharply defined outline. Dark ground illumination is difficult to apply for this purpose as a thin smear is required and the organisms may be scarce. The organisms can be found in the cotyledons, allantoic and amniotic fluids and in the stomach contents, pleural and peritoneal exudates and heart blood of the foetus. Specimens which have become cold must be warmed for examination. For staining, smears should be fixed in osmic acid and stained in fuchsin solution (1 c.c. saturated alcoholic fuchsin in 40 c.c. water). Specimens sent to the laboratory for examination should be sent as quickly as possible and

kept cool. At 2° to 4°C. the organism will live 12 days, but it dies in 12 hours in the incubator.—U. F. Richardson.

Simić, T. (1932). Étude biologique et expérimentale du *Trichomonas intestinalis*, infectant spontanément l'homme, le chat et le chien. [**Biological and Experimental Study of *Trichomonas intestinalis*, which naturally infects Human Beings, Cats and Dogs**].—*Ann. Parasitol.* **10.** 209-224. [10 refs.]

This article records the infection of cats and dogs with strains of human intestinal trichomonads and the experimental infection of human beings with strains from cats and dogs, and concludes that the intestinal trichomonads of man, cat and dog belong to a single species, *Trichomonas intestinalis*.

At Skoplje, 7 per cent. of the human population are infected and 30 per cent. of the canine population. It is known that a man may carry infection for over six months and a dog for over one and a half months. The parasites will live in water for 18 to 35 hours.—U. F. Richardson.

Bos, A. (1932). Over Trichomoniasis bij Duiven. II. Localisatic van Trichomonas columbae in spontane Gevallen. [**Trichomoniasis in Pigeons. II. Localization of *Trichmononas columbae* in Spontaneous Cases**].—*Tijdschr. Diergeneesk.* **59.** 1336-1341. [4 refs.] [Summaries in English, French and German : abst. from orig.]

The author investigated the localization of *Trichomonas columbae* in the organs of pigeons which were suffering from or had died of a disease characterized by the appearance of necrotic foci. He did so by making cultures from these foci, using as medium the Locke-egg-serum medium of Boek and Drbolav (1925). The flagellate was encountered in typical foci of liver, pancreas, heart, pericardium, pleura and peritoneum, but it was also seen in foci in lungs, blood vessels (vena cava) and in the wall of the oesophagus and surrounding muscular tissue, even in the covering skin.

Trichomonas were found, not only in the tissues, but they also occurred in preparations taken from the mouth, throat and crop, and occasionally in the intestine.—B. J. C. te Hennepe (Rotterdam).

Turner, A. W., & Murnane, D. (1932). **Giardia in Sheep in Victoria, Australia.** —*Austral. J. Exp. Biol. & Med. Sci.* **10.** 53-56. 1 fig., 1 table. [7 refs.]

This paper records the finding of *Giardia* in the small intestines of a cross-bred Merino wether which had been losing weight for several months and which died after two days illness, characterized by dulness, weakness and loss of appetite. In the contents of the small intestine, large numbers of *Giardia*, estimated at 1,000,000 per c.c. of intestinal contents, were found associated with Gram-positive bacilli.

The specimens of *Giardia* are described as being pear-shaped when viewed from the front ; on the flat ventral surface there is an oval peristome or sucker, and closely beneath the peristome are two vesiculated nuclei with large caryosomes. The parasite possesses eight flagella and two parallel axostyles. Posterior to the peristome is a cylindrical parabasal body, which may be double. The length varied from 11·5 to 17μ and the breadth from 7·5 to 11μ.

The forms described are smaller than species of *Giardia* affecting human beings, but are not so broad as *G. caprae* of the goat ; they most closely resemble *G. canis*.—U. F. Richardson.

I. Legg, J. (1933). **A Brief Review of the Piroplasms, with Special Reference to the Types Found in Australian "Red-water."**—*Austral. Vet. J.* **9.** 14-19. [4 refs.]

II. Seddon, H. R. (1933). **A Note on Piroplasmosis in New South Wales.**—*Ibid.* 19-20.

[Paper I was read at the General Meeting of the Australian Veterinary Association at Sydney, August, 1932].

I. As indicated in the title, this paper begins with a very brief historical survey of the classical work of Babes, Smith and Kilborne, Koch, Theiler and others. The author then gives a summary of the discoveries made in elucidating the aetiology of redwater in Australian cattle.

Three species of piroplasm have been recorded, *Babesia bigemina*, a species resembling *Theileria mutans* first found by Dodd and a species resembling *B.* (*Babesiella*) *argentinum* first found by Sohns, more recently recorded by Filmer. The morphology of each species is described. Strains of *B. bigemina* isolated in Queensland appear usually to be mild. The role of the second species has not yet been determined, but it is probably of low pathogenicity. The third species, however, is associated with a virulent form of redwater which does not yield to treatment with trypan blue. This organism may be found alone or together with *B. bigemina*, but in either case is only found in small numbers in blood smears.

II. [This is a summary of the remarks made by Dr. Seddon in opening the discussion on Dr. Legg's paper].

Seddon records that two pure strains of piroplasms have been isolated by serial passage, *B. bigemina* and a species resembling *Th. mutans*. The latter appears to be non-pathogenic. A third strain of organisms, probably a *B.* (*Babesiella*), has been obtained, but it is not yet certain that it is pure. This strain produces a high temperature reaction, but no other symptoms and, so far, no deaths have resulted following the inoculation of cattle.—J. R. Hudson.

Yakimoff, W. L., Nezwataïeff, N. W., Rastegaïeff, E. F., & Schmulewitsch, A. I. (1932). Die Ansteckung des Zebu mit Piroplasmiden. [**The Infection of Zebu Cattle with Piroplasms**].—*Zlb. Bakt. I.* (*Orig.*). **124.** 465-471. 24 figs. on 1 plate, 1 table. [8 refs.]

Yakimoff, W. L. (1933). Die Ansteckung des Zebu mit Piroplasmiden. II. Mitteilung. [**The Infection of Zebu Cattle with Piroplasms. Part II**].—*Ibid.* **127.** 307-308. 2 figs. [1 ref.]

The first article records the infection by inoculation of zebu cattle from Persia with *Babesia bigemina*, *Theileria mutans* and *Anaplasma rossicum*, and their infection by tick infestation with *B. bovis*. The incubation periods, in the case of the anaplasma and theileria infections, agreed with those recorded by South African authors. In the case of the babesia, the incubation periods were prolonged.

The second article records the receipt by the author of some microphotographs from Dr. G. di Domizio of Padua from which it appeared that the zebu cattle of Eritrea are susceptible to infection by *B. bigemina* and that the rinderpest virus will cause a relapse to piroplasm infection.—U. F. Richardson.

Schwetz, J. (1933). Sur une piroplasmose de deux Singes (un Cercopithèque et un *Cercocoebus*) des environs de Stanleyville (Congo belge). [**On a Piroplasmosis of Two Monkeys** (a *Cercopithecus* **and a** *Cercocoebus*) **from the Neighbourhood of Stanleyville (Belgian Congo)**].—*C. R. Soc. Biol. Paris.* **112.** 708-709. [3 refs.]

In examining the blood of 121 monkeys, the majority of which had been

killed whilst hunting, malarial parasites were found in a large proportion of the animals. Piroplasms were only detected in two monkeys, a *cercopithecus* and a *cercocoebus*, and in both cases they were associated with a plasmodium infection. The general morphology of the parasites resembled *Babesia bigemina*, but the pear forms were somewhat smaller. Twin forms were extremely rare.

—U. F. Richardson.

Yakimoff, W. L., Rastegaïeff, E. F., & Lewkowitsch, E. N. (1932). *Gonderia* (= *Theileria*) *mutans* in Russland (UdSSR.). [*Gonderia* (= *Theileria*) *mutans* **in Russia**].—*Arch. Protistenk.* **78.** 628-634. 12 figs., 3 tables. [20 refs.]

In this paper the authors discuss the small piroplasm encountered in Russia and consider that it resembles *Theileria orientalis*, a piroplasm of the *mutans* type found in the Far East and previously described by Yakimoff. An attempt is made to distinguish *Th. mutans*, *Th. annulata* and *Th. orientalis* by the ratio of round and oval forms to rod forms, but the authors conclude that the ratios are too variable. On the other hand, they consider that, on an average, the rod and pear forms of *Th. orientalis* are larger than those of *Th. mutans* which, in turn, are larger than those of *Th. annulata*. [This variation in size may depend upon the virulence of the strain of piroplasm or the resistance of the individual host].

—U. F. Richardson.

Sergent, E., Donatien, A., Parrot, L., & Lestoquard, F. (1932). Suppression expérimentale de la reproduction sexuée chez un Hématozoaire *Theileria dispar*. [**The Experimental Suppression of Sexual Reproduction in** *Theileria dispar*].—*C. R. Acad. Sci. Paris.* **195.** 1054-1056. [3 refs.]

This paper deals with the loss, by *Th. dispar*, of the power of being transmitted by the tick, *Hyalomma mauritanicum*, after it has been transmitted from ox to ox by inoculation. This power was found to have been lost by all strains which had been transmitted by inoculation even if transmission by inoculation had only occurred once. Larvae of *H. mauritanicum* were fed on calves which had been infected by inoculation and were at various stages of the resulting disease. 1,400 adult ticks raised from these larvae were fed on 22 clean calves without a single infection with *Th. dispar* resulting. The clean calves were afterwards proved to be susceptible to the disease by feeding infected ticks on them.

The organism also undergoes a morphological change ; towards the end of the acute stage of the disease it ceases to produce the small rod and comma forms to which Gonder has attributed the role of sexual elements, and is only found as a plasma body in ganglia and reticulo-endothelial tissue. The morphological modification only appears after several passages by inoculation.

The authors point out, that, in view of this discovery, a mild strain of *Th. dispar* can be used for immunization without fear of creating carriers of dangerous germs.

—U. F. Richardson.

—. (1933). Extracten uit de Maand- en Jaarverslagen der Gouvernements en Provinciale Veeartsen. Piroplasmose (Anaplasmose). No. 60. [**Extracts from the Monthly and Annual Reports of the Government and Provincial Veterinary Officers in the Dutch East Indies. Piroplasmosis (Anaplasmosis). No. 60**].—*Ned.-Indisch. Blad. Diergeneesk.* **45.** 129-131. [Abst. from orig.]

Injections into buffaloes of trypaflavine were introduced at Madioen. It appeared that a dose of 1·6 g. caused symptoms of intoxication ; young cattle withstood a dose of 0·5 to 0·75 g. in a 2 per cent. dilution, with success.

Of four animals, in which the disease was very advanced, two died after the injection, whilst the other two recovered completely. Twelve buffaloes, which showed slight symptoms, remained alive after the injection.

Some further cases of treatment with trypaflavine are also reported ; from the various cases the reader gathers the impression that the remedy will be of great value in severe cases, if the dose injected is above 1 g.

The tests are being continued.—B. J. C. te Hennepe (Rotterdam).

Neitz, W. O., & du Toit, P. J. (1932). **Bovine Anaplasmosis : A method of obtaining Pure Strains of *Anaplasma marginale* and *Anaplasma centrale* by Transmission through Antelopes.**—*18th Rep. Direct. Vet. Serv. & Anim. Indust. Union of S. Africa.* Part I. pp. 3-20. 9 figs., 5 tables. [8 refs.]

It was shown that, by inoculating blesbucks with the blood of an ox infected with *Babesia bigemina*, *Theileria mutans* and *Anaplasma marginale* and subinoculating from the blesbucks into clean cattle, the piroplasms could be eliminated and a pure infection of *A. marginale* obtained. In one case *Th. mutans* also appeared in one of the clean animals 12 weeks after inoculation, but this appeared to be due to accidental infection. *A. marginale* was detected in inoculated blesbucks after an incubation period of 25 days, but no symptoms developed. On splenectomy of a recovered blesbuck a reappearance of *A. marginale* occurred. *A. marginale* was also passed from an ox to a blesbuck, then to a sheep and then back to an ox.

A limited number of experiments were also conducted with a duiker with similar results, but in this case there was some uncertainty as to whether the original blood contained *B. bigemina*. Passage through antelopes did not appear to cause any alteration in the virulence of the strain of *A. marginale*.

Two attempts were made to obtain a pure strain of *A. centrale* by passage through blesbucks. In one, *Th. mutans*, apparently accidentally contracted, again prevented success, but in the second attempt a pure strain of *A. centrale* was obtained.

Blood infected with *B. bigemina*, *Th. mutans*, and *A. centrale* was kept for periods varying from five to nine days and over and then inoculated into clean calves. *Th. mutans* developed in all calves inoculated with blood kept less than nine days ; *A. centrale* appeared in one calf only, inoculated with blood kept seven days ; *B. bigemina* did not appear.

The authors consider that available evidence indicates that anaplasmosis is primarily a disease of antelopes.—U. F. Richardson.

Tehver, G. (1932). Sulgloomade ja kodujäneste koktsidioosist. [**Coccidiosis in Birds and Rabbits**].—*Eesti Loomaarst. Ring.* **8.** 193-197. 1 fig. [6 refs.] [From abst. in German by H. Richter (Tartu)].

The statistics of the clinic for small domestic animals at Tartu University during 1930 to 1931 show the following parasitic and infectious diseases in poultry:—fowl pox 2 per cent. ; *Bact. pullorum* infection 3 per cent. ; leucaemia 4 per cent. ; tuberculosis 11 per cent. ; scaly legs 36 per cent. ; coccidiosis and other parasitic diseases 44 per cent. There is no mention of rabbits in the text.—J. E.

Yakimoff, W. L., & Buewitsch, B. I. (1933). Zur Kokzidiose der Truthühner. [**On Coccidiosis of Turkeys**].—*Zschr. Infektkr. Haust.* **43.** 242-243. 2 tables. [2 refs.]

Microscopic investigations of turkey droppings were carried out by Darling's method in the Luga district near Leningrad. Oval or eliptical oocysts were detected, of which the majority were 21·6μ long by 18μ broad and which possessed

a polar granule. Of the previously recorded coccidia of turkeys, the Russian coccidium more closely resembles *Eimeria meleagridis* than it does *E. meleagrimitis*.
—U. F. Richardson.

Yakimoff, W. L., & Buewitsch, B. I. (1932). Zur Frage der Coccidien wildlebender Vögel in Aserbaidschan. Transkaukasus. [**The Coccidia of Wild Birds in Aserbaidjan (Transcaucasia)**].—*Arch. Protistenk.* **77.** 187-191. 8 figs. on 1 plate, 2 tables. [24 refs.]

The author records the presence in the faeces of wild birds of a species of coccidium to which the name *Eimeria caucasia* is applied.

The oocysts usually appeared in cylindrical form and measured on an average $32{\cdot}7\mu \times 19{\cdot}0\mu$. Four sporoblasts provided with a Stieda corpuscle were formed, each in turn giving rise to two sporozoites.

A description of a species of coccidium found in the faeces of Scottish partridge agrees closely with the characters of the one described.—S. J. Edwards.

I. Yakimoff, W., & Matikaschwili, I. (1932). Sur la coccidie du porc sauvage. [**The Coccidium of the Wild Pig**].—*Bull. Soc. Path. exot.* **25.** 1046-1048. 1 table.

II. Biester, H. E., & Murray, C. (1933). **Studies in Infectious Enteritis of Swine. VII. Studies on the Use of Colloidal Iodin in Swine Coccidiosis.**—*J. Amer. Vet. Med. Ass.* **82.** 79-83. 1 fig. [1 ref.]

I. The identification of the oocyst of *Eimeria debliecki* in the faeces of a wild pig (*Sus scrofa*) is reported.

II. In previous work the authors had determined the course and duration of coccidial infections in swine and had gained accurate data concerning the elimination of oocysts in artificial infections. The results were made use of in the present investigations, in which two groups of swine were infected and one of them treated with colloidal iodine. It was found that, up to 80 lb. live weight, pigs tolerated a dosage of 6 c.c. per lb. body weight, but that larger animals developed gastric symptoms with similar dosage. Maximal doses of colloidal iodine neither exerted any inhibitory action on the coccidia nor interfered with the life cycle.—R. S. Roberts.

Simić, T. (1933). L'infection du chien par l'*Entamoeba dispar* Brumpt. [**The Infection of the Dog by *Entamoeba dispar* Brumpt**].—*Ann. Parasitol.* **11.** 113-128. [7 refs.]

This article records the experimental infection of dogs by vegetative forms of *E. dispar*. The incubation period after rectal injection was 24 hours, after oral administration from three to eight days and, after contact with infected dogs, from four to eight days. Dogs freed themselves from infection in five to seven days and suffered no apparent illness. The parasite was never haematophagous and there was no alteration of the mucosa of the large intestine. It is suggested that young dogs could be used to differentiate *E. dispar* and *E. dysenteriae*, as the latter is pathogenic and causes acute colitis.—U. F. Richardson.

I. Faust, E. C. (1932). **Susceptibility, Resistance and Spontaneous Recovery in Dogs experimentally infected with Endamoeba hystolytica.**—*Proc. Soc. Exp. Biol. & Med. New York.* **29.** 659-661. 3 tables. [3 refs.]

II. Frye, W. W., & Meleney, H. E. (1932). **Investigations of *Endamoeba histolytica* and other Intestinal Protozoa in Tennessee : IV. A Study of Flies, Rats, Mice and some Domestic Animals as Possible Carriers of**

Intestinal Protozoa of Man in a Rural Community.—*Amer. J. Hyg.* **16.** 729-749. 11 figs. on 2 plates, 6 tables. [40 refs.]

I. Eleven strains of *E. histolytica*, of which two were of canine origin and nine of human origin, were used in the experiments. The majority of the dogs were inoculated by the intrarectal tubal method. 87 per cent. of the inoculated dogs proved positive by tubal *ante-mortem* examination and 84·5 per cent. were proved positive on necropsy. Nine cases of spontaneous recovery were encountered. A single inoculation usually appeared to be sufficient to produce infection and 53·5 per cent. of the dogs died from primary amoebic enteritis.

II. This paper deals with investigations into amoebic infection in the New Hope community, Jackson county, Tennessee, where 38 per cent. of the inhabitants harbour *E. histolytica*. Cysts characteristic of *E. histolytica*, *E. coli*, *Endolimax nana* and *Giardia* were detected in the droppings and intestines of house flies caught in habitations. *E. histolytica*, *E. polecki*, *Giardia*, *Iodamoeba*, *Endolimax nana* and *Chilomastix* were detected in the faeces of pigs. No evidence of *E. histolytica* infection was obtained in the case of rats, mice, dogs or fowls, though in the latter 18 out of 128 examined showed infection with *E. gallinarum*.

—U. F. Richardson.

Soudatschenkoff, W. W. (1932). Die Spirochäten der Mundhöhle des Pferdes. [**The Spirochaetes of the Mouth Cavity of Horses**].—*Arch. Protistenk.* **76.** 228-234. 2 tables.

Of 52 healthy horses examined, 42 showed mouth spirochaetes, the predominant type of which resembled *S. buccalis* of man, whilst a slender type was also encountered resembling *S. dentium*. An intermediate form also occurred. 52 per cent. of the horses showed a mucous membrane infection with A, B and C types of *S. buccalis*. Two horses suffering from ulcerative stomatitis showed spirochaetes in the ulcers which corresponded in size and form with *S. carpanoi*.

Foals up to six months old showed no spirochaetes in the oral cavity, but the organisms were present in large numbers in animals from six to eight months old.

—U. F. Richardson.

Picard, W. K. (1932). Hoenderspirochaetose. [**Fowl Spirochaetosis**].—*Ned.-Indisch. Blad. Diergeneesk.* **44.** 287-299. 1 plate. [1 ref.] [Summaries in English and German : abst. from orig.]

Pallaske, G. (1932). Zur Frage des Vorkommens eines infektiösen durch Spirochäten verursachten Ikterus gravis bei Hunden in Deutschland. [**The Question of the Occurrence in Germany of Icterus Gravis in Dogs caused by Spirochaetes**].—*Zschr. Infektkr. Haust.* **43.** 25-40. 4 plates. [19 refs.]

Klarenbeek, A. (1932). Fuso-spirochaeteus gangraen (Noma) bij een hond. [**Fuso-Spirochaetal Gangrene (Noma) in a Dog**].—*Tijdschr. Diergeneesk.* **59.** 1272-1277. [2 refs.]

The first paper records the detection of a case of fowl spirochaetosis in Java after five years search. The spirochaetes were found in spleen smears, stained by Giemsa's method, though the blood examination was negative. The fowl came from a poultry farm on which *Argas persicus* could not be detected. Previously a heavily tick-infested farm had been kept under observation, but no typical cases of spirochaetosis were encountered, nor was it possible to detect spirochaetes in birds which died nor to produce spirochaetosis in clean birds by allowing ticks to feed on them.

The author considers that the aetiological connection between spirochaetosis of fowls and *A. persicus* in Java is still an open question.

The second article records the finding of spirochaetes in kidney sections, stained by the Levaditi method, in a pup which had died of jaundice. Guinea pigs were successfully inoculated with liver and kidney emulsions and two sub-passages were effected in guinea pigs. The presence of spirochaetes could not be satisfactorily demonstrated in stained smears, by dark ground examination of fresh material or by cultures, but they were easily identified in sections of the kidney of the dog and in sections of the kidney, liver and other organs of the guinea pigs.

The author considers that spirochaetosis (leptospiral jaundice) is a disease of young dogs and should not be confused with Stuttgart disease or uraemia which is common in adult dogs in Germany.

The third paper describes a case of gangrenous stomatitis in a dog associated with fusiform bacilli and spirochaetes ; the significance of the organisms, which are probably secondary invaders, is discussed. Local treatment by painting with 3 to 4 per cent. neosalvarsan is recommended.—U. F. Richardson.

Krause, C., & Goranoff, S. (1933). Ueber Sarkosporidiosis bei Huhn und Wildente. [**On Sarcosporidiosis in the Hen and in Wild Ducks**].—*Zschr. Infektkr. Haust.* **43.** 261-278. 1 table. [16 refs.]

This article records that, of 41 hens which came under observation after death from fowl cholera, 50 per cent. were infected by sarcocysts. The muscles most favoured by the parasites were those of the head, neck and pelvic region. The authors consider that the parasite encountered is a new species and they suggest the name of *Sarcocystis gallinarum*. The parasite may, however, be identical with *S. horvathi* recorded from hens in Hungary by von Rátz from which it only differs slightly in size.

An attempt was made to transmit *S. blanchardi* of the buffalo to hens by feeding and success is claimed, although unfortunately the control hen was found to harbour *S. gallinarum*. The cysts of *S. blanchardi* could not be distinguished morphologically from those of *S. gallinarum*.

A case of generalized sarcosporidiosis of a wild duck is recorded. The cysts were very large and were extracellular and do not agree with any form previously described. The name *Sarcocystis anatina* is suggested.—U. F. Richardson.

DISEASES CAUSED BY VIRUSES.

Ledingham, J. C. G. (1932). **A Paper on Tissue Changes in Virus Diseases.**—*Brit. Med. J.* Nov. 26th. 953-957. [53 refs.] [Paper presented to the sections of Bacteriology and Pathology at the Centenary Meeting of the British Medical Association, London, 1932].

The individual elements of viruses vary in size from those such as variola, vaccinia and fowl pox, which are just large enough to be demonstrable, to those which are only slightly larger than a molecule of haemoglobin. Some viruses, for example, rabies, are associated with cell inclusions, but individual elements have not yet been demonstrated ; others, such as distemper, rinderpest and fowl plague, have not yet been shown to have any peculiar histological picture, or any inclusion bodies.

Different viruses also have affinities for different tissues. The pock viruses attack essentially the skin. The fowl pox virus, for example, attacks epithelial

cells of the comb, etc., producing nodules consisting of enormously swollen and obviously degenerate epithelial cells. These cells contain the Bollinger bodies, which consist of large numbers of elementary virus bodies called Borrel bodies. The group of neurotropic viruses attack the nervous tissue. Of these, vaccinia (after intracerebral inoculation only) produces meningitis with little or no encephalitis, while rabies, Borna disease and " louping ill " attack and destroy neurons.

As an example of virus attacking parenchymatous cells, the yellow fever virus of man produces fatty degeneration and necrosis of the liver cells. [Rift Valley fever disease of sheep produces similar lesions].

Oral papillomatosis in dogs is caused by a filtrable virus, which can be transmitted to healthy puppies by introduction into the buccal mucosa. The histology of these warts is essentially a layer of enlarged clear epithelial cells, increased both in cytoplasm and nucleus, and corresponding to the enlarged cells of fowl pox, but here no inclusion bodies are found.

The possible association of bacteria with viruses is demonstrated by recent work on swine influenza. Here, a filtrable virus acts along with a haemoglobinophilic bacterium, *Haemophilis influenzae suis*, to produce the typical disease. The bacillus alone does not infect. The virus alone produces only a mild disease. In pigs experimentally infected with raw material and killed during the febrile phase before showing any other clinical manifestation, the lungs showed areas of atelectasis with adjoining areas of emphysema. In fatal cases these atelectatic areas became pneumonic. Animals inoculated with filtrate only and killed showed pulmonary atelectasis varying from very slight to as extensive as that found in mild cases of the natural disease.—A. Brownlee.

Albiston, H. E., Gregory, T. S., & Johnstone, R. N. (1932). **The Control of Pleuro-Pneumonia Contagiosa of Bovines.**—*Austral. Vet. J.* **8.** 58-63. 1 table, 1 appendix. [4 refs.]

[Report of the Committee of the Veterinary Association of Victoria appointed to collect information about the efficacy of inoculation in the control of contagious bovine pleuro-pneumonia].

The history of bovine pleuro-pneumonia in Australia, particularly in Victoria is related. It recently appeared in this state after several years absence and information on vaccination methods for possible use was sought. The committee advised against the use of vaccines and urged control by more particular attention to early diagnosis combined with compulsory slaughter and quarantine orders. An improved sero-diagnostic method is required. These suggestions apply to Victoria alone and are not stated to be suitable for other states, where animal husbandry conditions are so different.—J. E.

Curasson, G. (1932). Nouvelles recherches sur le vaccin contre la péripneumonie bovine. [**Recent Research on the Vaccine against Contagious Bovine Pleuro-Pneumonia**].—*Bull. Acad. vét. France.* **5.** 179-184. [4 refs.]

This article is supplementary to two preliminary papers published in 1930 in the *Bull. Acad. vét. France.* **3.** 95 and 322. These concerned a new formolized vaccine, which has now been used on several hundred cattle with very favourable results.

The vaccine consists of pleural lymph and extract of lung lesions citrated and formolized at 4:1,000 and used from between the 5th and 15th days after preparation. The dose is large—60 c.c. for calves and 120 c.c. for adults, given subcutaneously. The vaccine has been used on 1,767 in-contact beasts with a subsequent mortality of only 1·08 per cent.—J. E.

Doyle, T. M. (1933). **The Viability of the Virus of Swine Fever in Bone Marrow, Muscle and Skin of Preserved Carcasses.**—*J. Comp. Path. & Therap.* **46.** 25-37. 4 tables. [11 refs.]

The investigations carried out by various workers during recent years have demonstrated the importance of infected preserved carcasses in the dissemination of certain animal virus infections. It has been proved that the viruses of foot and mouth disease, fowl plague, Newcastle disease of fowls and swine fever are capable of remaining viable for long periods in the tissues of preserved carcasses, and there is strong circumstantial evidence that foot and mouth disease and swine fever can be introduced into a country through this channel.

In the present article are recorded experiments which proved that the virus of swine fever can survive for at least 73 days in the bone marrow of " salted " and " chilled " carcasses.

The virus survived 17 days in the skin and muscles of pigs killed before the appearance of clinical symptoms ; there was some evidence that virus was still present in salted muscle after 73 days. The virus survived 42 days in salted skin and muscle of pigs killed *after* the appearance of clinical symptoms.

The virus survived for 37 days (not the end-point) in bone marrow and muscle, and for 19 days in skin of smoked carcasses.—T. M. Doyle.

Barry, W. C. (1933). **Swine Fever. Some Current Information for Farmers.** —*New Zealand J. Agric.* **46.** 321-326.

[Lecture broadcast from Radio Station 2YA, Wellington, 23rd May].

The text of a broadcast wireless talk, primarily for farmers, but suggested because of an outbreak of swine fever in garbage-fed pigs on farms round Wellington city. The nature of the disease is described and also the methods adopted by the Department of Agriculture to prevent spread. [The position at the time of abstracting is that the outbreak was confined to a few farms near Wellington and that swine fever has been stamped out].—C. S. M. Hopkirk.

I. Cox, H. R., & Olitsky, P. K. (1933). **Neurotropism of Vesicular Stomatitis Virus.**—*Proc. Soc. Exp. Biol. & Med. New York.* **30.** 653-654. [4 refs.]

II. Cox, H. R., & Olitsky, P. K. (1933). **Further Studies on Neurotropism of Vesicular Stomatitis Virus.**—*Ibid.* 654-655. [3 refs.]

I. The virus of vesicular stomatitis is peculiarly epitheliotropic (dermotropic) in the guinea pig : only the pad tissue of the dermal surface is uniformly susceptible. The authors obtained samples of strains of virus propagated in guinea pig pads for several years. After 20 consecutive transmissions of the experimental disease in pads, the strains were filtered and inoculated intracerebrally into guinea pigs. From two to five days after injection, the animals exhibited first weakness, then paresis of both posterior extremities and later complete paralysis. About 60 per cent. died during the paralytic stage. Brain to brain passages were then made, practically all the animals proving susceptible to intracerebral inoculation. The microscopic appearance of the organs is described. The identification of the neurotropic nature of the stomatitis virus is based upon the characteristic local lesions following the injection of pads with active brain tissue and on cross-immunity tests. Brain material preserved in glycerol retains its neurotropism for at least 32 days.

II. The neurotropism of vesicular stomatitis was demonstrated in white mice which were shown to be suitable as a substitute for the guinea pig as an experimental animal. It is suggested that, vesicular stomatis virus having a generic relationship to the incitant of foot and mouth disease, the use of the white mouse

may prove advantageous in experimental work with the latter virus.

—Ll. E. W. Bevan.

Neitz, W. O. (1933). **The Blesbuck** (*Damaliscus albifrons*) **as a Carrier of Heartwater and Blue Tongue.**—*J. S. Afric. Vet. Med. Ass.* **4.** 24-26. [4 refs.]

Heartwater.—A blesbuck which had been inoculated intravenously with virulent blood showed no symptoms which could be ascribed to heartwater, but died on the 25th day from panverminosis. Subinoculations into sheep from this blesbuck on the 10th and 12th days failed to produce heartwater, but produced a positive result in a sheep on the 18th day.

Blue tongue.—Using two blesbuck it was found that, though they were " carriers " of blue tongue, they did not show any clinical symptoms. By inoculation of susceptible sheep it was possible to demonstrate the presence of the virus in their blood on the 10th, 14th and 17th days, but not on the 20th, 24th and 40th days. The potency of the virus was not altered by passage through the blesbuck.

—Edward F. Peck.

I. Datta, S. C. A., & Rajagopalan, V. R. (1932). **An Unusual Case of Chronic Rinderpest with Special Reference to the Carrier Problem in this Disease.**—*Ind. J. Vet. Sci. & Anim. Husb.* **2.** 357-382. 5 charts. [85 refs.]

II. Cooper, H. (1932). **Rinderpest : Transmission of Infection by Contact.**—*Ibid.* 383-392. 3 tables.

I. The major part of this paper deals with supposed "carriers" of rinderpest. It is pointed out that the outbreaks of rinderpest which occurred in England (1865), Romblon (1916), Belgium (1920), Brazil (1921) and Australia (1926) possibly owed their origin to carriers. It is assumed that, if this had not been the case, the disease would have been observed during the voyage from the country of origin. Further, the fragility of the virus is considered sufficient to have precluded the possibility of spread by indirect contact. Many other instances of suspected carriers are cited and the role played by insects, flies, ticks and wild animals is reviewed. It is considered improbable that they play much part in the propagation of the disease and it is thought likely that domestic animals themselves are the common source of infection. The following case is presented in support of this view.

Two bulls were inoculated with rinderpest virus which had been passed alternately through bulls and goats. The one bull from the third to the ninth day after inoculation showed slight pyrexia accompanied by diarrhoea ; a few theileria parasites were seen in the blood, but no ulcers or vesicles were exhibited ; the other bull died from rinderpest. The survivor was then put into a shed which had been used to house post-reaction rinderpest cases and it died there on the 74th day after the initial inoculation. Subsequent experiments with spleen and blood which had been stored in the refrigerator for four and a half days showed that " the spleen collected from an animal, dying of chronic rinderpest 74 days after the inoculation, was infective by inoculation into susceptible bulls, while the blood was not."

II. Using highly susceptible cattle at Muktesar, Cooper found that the most contagious period in the rinderpest syndrome was between the fifth and tenth day after artificial infection and that from the tenth to fifteenth day the disease failed to spread by contact. Propagation by contact was surprisingly slow, a minimum period of three days association with infective animals being required. In the 14 animals used, which were exposed to various stages of the disease, the average period of contact was 15 days, the longest time a susceptible animal was in contact

before becoming infected being 33 days. It is considered too early to draw conclusions from these results, but if, as is indicated by these experiments, the disease progresses slowly, control by the " serum-alone " method must be prolonged, tedious and expensive.—Edward F. Peck.

Ismail, R., & Zühdi, M. (1933). Die Rinderpest in der Türkei, Bekämpfungsmethoden und neue Versuche. [**Rinderpest in Turkey, Methods of Control and New Research**].—*Arch. wiss. prakt. Tierhlk.* **66.** 70-85. 1 fig., 4 tables. [13 refs.]

Scientific investigation into rinderpest began in Turkey in 1897, but there had been outbreaks in 1855, 1863, 1887 and 1888. Since 1897 there have been many serious outbreaks in which as many as 70 or 80 per cent. of the cattle perished.

The results of special experiments have established :—(a) that rinderpest formol vaccine administered intracutaneously confers, after four days, immunity against a fatal dose of virus injected subcutaneously, whilst vaccination administered subcutaneously does not give immunity until after eight days ; (b) to insure protection against a fatal dose of virus only 5 c.c. of vaccine per 100 kg. body weight are required if injected intracutaneously, as against 20 c.c. if injected subcutaneously and (c) the immunity attained lasts at least seven months.

It was desired to obtain a vaccine that remains potent for a longer period and a method of drying the material has been found. Spleen and lymph gland extract used for the production of liquid formol vaccine and dried according to the method described retains its immunizing activity after desiccation. It can be prepared in the laboratory and sent long distances and remains active for ten months. Used intracutaneously the inoculating material is absorbed within ten days.—F. Bullock.

Hurst, E. W., & Pawan, J. L. (1932). **A Further Account of the Trinidad Outbreak of Acute Rabic Myelitis : Histology of the Experimental Disease.** —*J. Path. & Bact.* **35.** 301-321. 13 figs., 2 tables. [11 refs.]

This paper is complementary to a previous one [see this *Bulletin.* **1.** 285]. Here the authors describe further human cases of what has been proved to be a form of rabies following bites on the foot by a species of bat, though the transmission has not yet been proved experimentally. They also describe the histology of the experimental disease in monkeys and rabbits infected from human material and brain tissue from cattle which had died of the same infection (previously supposed to be botulism). Finally, cross-immunity tests with the Trinidad virus, fixed virus and virus from cases of bovine " mal de caderas " of Paraguay, proved them all to be the same entity.—J. E.

I. Remlinger, P., & Bailly, J. (1933). Le siège du virus dans la maladie d'Aujeszky expérimentale. [**The Predilection Sites of the Virus in experimentally induced Aujeszky's Disease**].—*C. R. Soc. Biol. Paris.* **113.** 125-126. [1 ref.]

II. Remlinger, P., & Bailly, J. (1933). L'urine dans la maladie d'Aujeszky expérimentale. [**The Urine in experimentally induced Aujeszky's Disease**]. —*Ibid.* 255-257.

The virus of Aujeszky's disease, or pseudorabies, when inoculated into a susceptible animal, travels to the central nervous system *via* the blood and lymph stream and not by way of the peripheral nerves as in rabies. Death occurs not infrequently while the virus is still present in the blood and lymph system and this fact explains the occasional failure to set up infection by the inoculation of brain tissues from an animal dead of the disease.

The site of greatest concentration of the virus in the brain has not yet been determined and the absence of bodies analogous to Negri bodies renders the working out of this aspect of the problem particularly delicate. The virus is not present in the saliva of affected animals. Attempts to set up infection with bile, urine, and faeces have also up to the present given negative results.

On autopsy of animals that have died of artificial infection with Aujeszky's disease, the kidneys appear to the naked eye to be normal, while the bladder is frequently distended, probably the result of paralysis. Examination of the urine of 134 rabbits dead of the disease revealed the presence of sugar in 84 cases : the maximum quantity found was 66·20 g. per litre. Albumen was found to be frequently present in the urine of rabbits which have died of the disease.

Attempts to set up the disease in rabbits and guinea pigs by the inoculation and ingestion of urine from affected animals gave negative results.—T. M. Doyle.

I. Shope, R. E. (1932). **Identity of the Viruses Causing "Mad Itch" and Pseudorabies.**—*Proc. Soc. Exp. Biol. & Med. New York.* **30.** 308-309. 1 table. [3 refs.]

II. Granouillit. (1933). Sur un cas de rage mue à forme atypique rappelant la maladie d'Aujesky. [**An Atypical Case of Dumb Rabies resembling Aujeszky's Disease**].—*Rev. vét. et J. Méd. vét.* **85.** 142-143.

I. "Mad itch" antiserum completely neutralized "mad itch" and pseudorabies viruses ; likewise, pseudorabies antiserum neutralized both viruses. The test mixtures were stored in the refrigerator over night and injected into guinea pigs.

II. The author was called to see a dog, on November 1st, which was prostrate and vomiting. Pruritus of the fore limbs was very marked and the animal licked the affected parts in a frenzied way. The following day the vomiting had abated, but the pruritus persisted and slight paralysis of the pharynx was present. The disease was now thought to be Aujeszky's disease. However, owing to the limited distribution of this disease, such a diagnosis was ruled out in favour of atypical dumb rabies.

For three days the animal showed almost the same symptoms. There was no dropping of the jaw or noticeable salivation. On November 3rd the owners were advised to undergo antirabic treatment as it was possible they might have become infected from the saliva. The dog died at 2 a.m. on November 4th. A piece of the medulla was taken six hours after death and sent in glycerine to the Pasteur Institute at Saigon. Two rabbits inoculated subdurally became paralysed 20 days later. Usually, the street virus in Cochin-China paralyses rabbits in 10 to 12 days. There is a footnote to the effect that another veterinarian in Cochin-China found two cases of rabies in dogs, which showed bloody diarrhoea only. Both animals died in two to three days. The medullas were sent to the Pasteur Institute and diagnosed as rabies.—George Slavin.

Nikoli′, M. (1932). Paralysis bulbaris infectiosa (Morbus Aujeszky). [**Pseudo-Rabies**].—*Zschr. Immun.-Forsch.* **77.** 311-315. [6 refs.]

The author describes an instance in which a man was bitten by a dog in circumstances in which steps were taken to ascertain if the dog was affected with rabies. Examination of the dog's brain and inoculation of a rabbit with material from it showed that rabies virus was absent, but that the dog was affected with Aujeszky's disease. The man was given antirabies treatment at once as a precautionary measure pending diagnosis and remained healthy : the author emphasizes that he did not contract prurigo or any other symptom of infection.

From experimental work performed, the author states that, in his opinion, the virus of Aujeszky's disease is only a variety of rabies virus.—J. E.

Remlinger, P., & Bailly, J. (1932). L'état d'entretien d'un animal est sans influence sur la pathogénie de la rage. [**The Pathogenicity of Rabies is not influenced by the Condition of the Animal**].—*C. R. Soc. Biol. Paris.* **109.** 1074-1076. [1 ref.]

The experiments described do not indicate that the health of the animal, its feeding or the conditions under which it is housed have any effect upon the subsequent infection with rabies following the intramuscular inoculation of the street virus.—Norman Dobson.

Remlinger, P., & Bailly, J. (1932). La rage et le virus rabique au Maroc. [**Rabies and the Virus of Rabies in Morocco**].—*Bull. Soc. Path. exot.* **25.** 289-294. [3 refs.]

There has been a large increase in the incidence of rabies in Morocco during recent years. The authors attribute this to the large immigration of French and Spanish people who bring dogs with them. They find that the disease is almost exclusively transmitted by dogs and cats. The investigation of many strains does not indicate that the viruses found in Morocco differ from those investigated in European countries.—Norman Dobson.

Levaditi, C. (1932). Recherches sur la morphologie du virus rabique. [**Research on the Morphology of the Rabies Virus**].—*C. R. Soc. Biol. Paris.* **110.** 771-772. [1 ref.]

Levaditi, C., Schoen, R., & Mezger, J.-G. (1932). Morphologie du virus rabique. [**Morphology of the Rabies Virus**].—*Ibid.* 1215-1216. [3 refs.]

Further histopathological studies upon the modes of development of the rabies virus within the nerve cells of the brain. Two modes are described, namely (a) a scattered and (b) an encysted form of development. The scattered form of development is shown to bring about the appearance of many-shaped, sometimes branching, clusters of elementary bodies within the cytoplasm. The encysted form is associated with the appearance of Negri bodies, i.e. the cysts or pansporoblasts, from the onset of cell invasion. The name *Glugea lyssae* is assigned to the parasite in virtue of the cycle of development portrayed.

Whether the one or the other form of development predominates depends upon the strain of virus, the species of animal inoculated and the type of nerve cell invaded. By selective fixation and staining methods, both forms of development can be clearly distinguished from the cytoplasmic structures proper, mitochondrial and vacuolar, though multiplication of the parasite seems to take place in intimate relationship with these structures. Thus, the tendency to variation in the mode of development would be dependent not only upon the activity of a given strain of virus, but also upon the mitochondrial characteristics of the invaded nerve cell.—J. T. Edwards.

Greval, S. D. S. (1933). **On Rabies. Complement Fixation in Rabies : The Technique, its Purposes and Associated Considerations.**—*Ind. J. Med. Res.* **20.** 913-920. 2 tables. [13 refs.]

The purposes of the technique here described were to determine by a complement-fixation method the potency of various antirabic sera and also to assay the efficacy of different vaccines by titrating them against a constant serum. The antigen which gave the most satisfactory results was a paper filtrate of a three-

month-old carbolized sheep brain virus : this antigen improved with age and was safe to handle. The standard antiserum was prepared in a sheep immunized over a period of two months with a dead fixed virus.

In conducting the test, constant amounts of antigen and antiserum diluted 1 : 5 were titrated against increasing M.H.D. of complement varying from 3, 4 and 5 up to 8, 10 and 12 according to the potency of the sera. By adopting this method, constant and comparable results were obtained.

It is stated that the ultimate object of the investigation was the substitution of neutralization experiments which not only take considerable time, but are incapable of giving exactly comparable results, by an accurate serological method. The paper is regarded as a preliminary observation on the subject.—R. E. Glover.

Itabishi, K. (1932). **Studies on the Intraplantar Inoculation of Rabic Virus. II. Experiments with *virus fixe* (second report). III. On the Localization of the Virus in the Lumbar Cord of Guinea-Pigs.** —*Orig. Contrib. Mukden Inst. Infect. Dis. Anim.* **2.** 167-179 and 181-186. [Summaries in English : abst. from author's summary].

The author has studied the intraplantar inoculation of fixed rabies virus in guinea pigs. His results can be summarized as follows :—(1) rabies virus brain can be transmitted only with difficulty by this route, but if the lumbar cord is used, no difficulty is experienced. In either case the virus is apparently unchanged after 20 passages, but the incubation period is slightly prolonged and (2) the brains of animals inoculated by the intraplantar route did not appear to contain virus until after the third or fourth passage ; the lumbar cords, however, were positive in all generations [presumably by subdural test]. Intraplantar tests of the brains and cords of animals inoculated by the intraplantar route showed 37 out of 41 lumbar cords to be infective, as against 3 out of 11 brains.

He concludes that his results indicate that, following intraplantar inoculation, virus multiplication is more rapid in the lumbar cord than in the brain. The intraplantar susceptibility of the guinea pig depends upon the virus concentration, and in such animals the greater the distance of the nervous tissue from the site of inoculation, the less is the concentration of virus.—Norman Hole.

—. (1933). **The Prevention of Dog Distemper : Final Report of the "Field" Distemper Council.**—*Vet. J.* **89.** 3-5.

After ten years of research work carried out by Laidlaw and Dunkin under the auspices of the Field Distemper Council and assisted by the Medical Research Council, the cause of distemper has been clearly defined and its nature understood. Primary distemper is due to an ultramicroscopic filter-passing virus. It can be readily transmitted from ferret to dog and *vice versa*. An infective virus was obtained as also was a vaccine together with an antiserum. A healthy dog can be given lasting protection against the disease by the inoculation of vaccine followed by an inoculation of virus a fortnight later. Later it was found that an animal could be immunized by the simultaneous inoculation on different sides of the body with antiserum and virus. Antiserum alone is of value in the early stage of distemper as it lessens the severity of the attack.

Prior to this research work, the incidence of distemper amongst hunting packs was nearly 100 per cent., the death rate being frequently 50 per cent. and often exceeding 75 per cent. With the vaccine-virus method of prevention, the incidence of disease is only 1·4 per cent. and the death rate 0·3 per cent. The use of serum for curative treatment is giving poor results except when given in the very early stages. As true distemper has been found to exist among silver

foxes and ferrets, fitches, minks and fishers the results of the work of LAIDLAW and DUNKIN will have a far-reaching effect on the commercial value of farming these animals and may give us increased knowledge into virus diseases generally.

—F. W. MEDLOCK.

DOYLE, T. M. (1933). **The Virus Diseases of Animals with Special Reference to those of Poultry.**—*J. Comp. Path. & Therap.* **46.** 90-107.

Under this title, the author summarizes the salient points made in two lectures which he delivered at the Royal Veterinary College on February 19th and 26th, 1933.

The author first of all discusses the properties of viruses in general. The filtrability of viruses and the pitfalls of filtration technique are mentioned, followed by a summary of the progress made in virus cultivation. The ways in which virus diseases are disseminated are then considered, emphasis being laid upon the preserved carcass as the most important channel by which such diseases are introduced into this country. It is stated that outbreaks of foot and mouth disease, swine fever and possibly Newcastle disease can be explained in this way. The contention that " carriers " of virus infection play a part in the dissemination of disease is still doubtful, indisputable evidence of the existence of "carriers" being lacking.

The comparative values of the various methods which may be employed in immunizing animals against virus diseases are considered, attention being paid to the use of dead and living virus, serum, alone or in conjunction with virus, and the use of modified virus, e.g. formolized virus, either alone or followed by live virus.

The author then describes in detail the virus diseases of poultry, viz., fowl pox, fowl plague, Newcastle disease and laryngotracheitis, due consideration being given to the properties of the respective viruses, the significance of inclusion bodies, the symptoms, lesions, methods of diagnosis and immunization.

—GWILYM O. DAVIES.

BURNET, F. M. (1933). **A Virus Disease of the Canary of the Fowl-Pox Group.** —*J. Path. & Bact.* **37.** 107-122. 10 figs. on 2 plates, 4 tables. [14 refs.]

The author studied the virus disease of canaries first described by KIKUTH and GOLLUB [(1932). *Zlb. Bakt. I. (Orig.).* **125.** 313]. He confirmed their findings that the virus caused a uniform type of infection with a characteristic local lesion and that in an infective dose it was constantly fatal to canaries. Chickens, pigeons and budgerigars were resistant to infection, but sparrows died of a typical infection, the course of which was somewhat more prolonged than in canaries. In artificially infected canaries a local lesion occurred at the site of inoculation and occasionally a little inflammatory exudate was present in the pericardial sac. The skin was considerably thickened over the local lesion and many of the epithelial cells contained one or more acidophil cytoplasmic bodies. The standard type of inclusion body " consists primarily of a round or oval vacuole about the same size as the cell nucleus. The vacuole has a sharply defined edge and is filled with acidophil granules much more closely packed round the periphery than towards the centre."

The virus would appear to be capable of multiplication within the cytoplasm of cells originating from all three primary germinal layers.

A few experiments with formalin (0·1 per cent.) and phenol (0·5 per cent.) showed the virus to be highly resistant to these agents. In filtration experiments

(carried out in collaboration with W. J. Elford) with "gradacol" membranes, the size of the virus was found to be from 0·125 to 0·175μ.

The virus, when inoculated into the chorioallantoic membrane of the developing egg produced lesions that bore a general resemblance to those set up by the inoculation of fowl pox virus, but the lesions could nevertheless be readily differentiated.

A strain of fowl pox virus when inoculated into canaries caused a fatal infection with lesions similar to those produced by the canary virus and histological examination showed similar but less marked changes.

Burnet believes that the canary virus should be grouped with the bird-pox viruses on account of its resistance to formalin and phenol, its relatively large size and its ability to produce fowl pox-like inclusions in epithelial cells.

A plate showing six microphotographs of the virus bodies taken by J. E. Barnard in ultra-violet light by his dark ground method is included.—T. M. Doyle.

I. Hudson, C. B., & Beaudette, F. R. (1933). **The Susceptibility of Cloacal Tissue to the Virus of Infectious Bronchitis.**—*Cornell Vet.* **23.** 63-65. 1 table. [2 refs.]

II. Beaudette, F. R., & Hudson, C. B. (1933). **Experiments on Immunization against Laryngotracheitis in Fowls.**—*J. Amer. Vet. Med. Ass.* **82.** 460-476. 8 tables. [4 refs.]

I. The purpose of this paper was to show the susceptibility of cloacal tissues to the virus of infectious bronchitis. Emulsions of dried tracheal exudates were applied to the mucous membrane of susceptible birds and produced in 48 to 72 hours a marked oedema and inflammation. The disease subsided rapidly, the tissues returning to normal after about nine days. Passage to the trachea of other birds resulted in the appearance of typical respiratory symptoms.

II. In this communication the value of the cloacal route in inducing an immunity to the virus of laryngotracheitis has been further investigated.

The vaccines were prepared from dried virus emulsified in 50 per cent. glycerine : 4 mg. per c.c. of diluent induced cloacal lesions in 57 out of 58 birds while smaller amounts were less certain in this respect. The immunity developed rapidly and embraced both the cloaca and the respiratory tract.

The vaccination of very young chicks was not successful, as the reactions were often too severe. Birds of two to three months of age were more uniformly susceptible to infection by the cloacal route than were six-month-old fowls in whom the proportion of " takes " might be as low as 9 per cent. Limited observations indicated that vaccinated birds were not carriers of the virus.—R. E. Glover.

Pacheco, G. (1932). Investigaçoes sobre doenças de Psittacideos. [**Investigations upon the Diseases of Psittacidae**].—*Mem. Inst. Oswaldo Cruz, Rio de Janeiro.* **26.** 169-233. 20 tables, 12 photographs. [49 refs.]

In view of the importance attached to the parrot as a natural reservoir of psittacosis the author made a detailed study of diseases of parrots which bear a resemblance to psittacosis. These appear to fall into two groups :—those caused by filtrable virus and those in which pathogenic bacteria but no virus can be demonstrated. The former were found to be rare ; out of a large number of birds only one was found to harbour the true psittacosis virus. The remainder of the virus cases appeared to be due to a hitherto undescribed virus, which the author designates as " São Paulo virus." This latter was found to be specific for psittacidae and was only transmitted with ease in birds of the genus *Amazona*. Parakeets could be infected artificially, but did not contract the disease by contact, nor

transmit it amongst members of their own genus. The " São Paulo virus " differs from the true psittacosis virus in that it displays no affinity for nerve tissue, is rapidly destroyed by desiccation and gives rise to necrotic foci in the liver, spleen and lungs. In common with the true virus it passes through the finer candles, is stable at 55°C. and active in low dilutions.

Far more common is a less acute disease caused by bacteria, particularly those of the salmonella group. This runs a more protracted course and recovery frequently occurs. At *post-mortem* examination a similarity is observed between this disease and the virus diseases, but bacteria are found in the blood and viscera ; they are not easily transmitted. The author is of opinion that avitaminosis or monotony and inadequacy of diet are necessary to precipitate infection. *Bact. psittacosis* was isolated from some of these cases ; from others a salmonella organism was isolated which differed from the latter in its fermentation reactions. Numerous other bacteria, mainly of the salmonella group, were isolated but are not described.—R. S. Roberts.

I. Ledingham, J. C. G. (1933). **The Development of Agglutinins for Paschen Bodies in Experimental Vaccinia, with Illustrative Charts.**—*J. Path. & Bact.* **36.** 425-429. 4 charts. [2 refs.]

II. Amies, C. R. (1933). **The Elementary Bodies of Varicella, and their Agglutination in Pure Suspensions by the Serum of Chicken-Pox Patients.**—*Lancet.* **224.** 1015-1017. 1 table. [11 refs.]

I. Ledingham describes the development of agglutinins for Paschen bodies in rabbits' blood. The period during which agglutinins were at their maximum varied with individual rabbits from the 10th to the 30th day. Zone effects were slight and did not interfere with reading the results.

Ledingham favours incubation of the tests at room temperature and the use of fresh immune sera, as he believes that this method prevents the occurrence of zones and inhibitory phenomena.

II. Amies examined a number of specimens of varicella fluid and confirmed the presence of elementary bodies in the early stages of the eruption. A detailed description is given of the technique for the preparation of stained films, and of suspensions, of elementary bodies.

He showed that suspensions of the elementary bodies were specifically agglutinated by the sera of 55 patients convalescent from varicella. Agglutination tests were made in hanging drop preparations in a vaselinized chamber.

" The constant presence of elementary bodies in the early vesicle fluid, and the fact that they are specifically agglutinated by the homologous antiserum are regarded as strong evidence in favour of the view that these represent the actual infecting agents of varicella."—T. M. Doyle.

Eagles, G. H., & Kordi, A. H. H. (1932). **The Cultivation of Vaccinia Virus : A New Series of Subcultures in Cell-Free Medium.**—*Proc. Roy. Soc. London. Ser. B.* **111.** 329-337. 1 fig., 2 tables. [10 refs.]

In view of the failure of other investigators [Maitland, Laing & Lyth, this *Bulletin.* **2.** 442 ; Rivers & Ward, this *Bulletin.* **3.** 544.] to confirm the results of Eagles & McClean [(1930). *Brit. J. Exp. Path.* **11.** 337.] on the cultivation of vaccinia virus in a cell-free medium, and of the criticisms which have been advanced that the kidney extract might contain residual living cell fragments, a fresh series of experiments was undertaken.

Rabbit kidney ground to a creamy paste was diluted with 9 per cent. saline solution. One portion was left at laboratory temperature for one hour and then

made isotonic with distilled water, while a second part was frozen and thawed before dilution. The former extract gave the better results. The mixtures were centrifuged for one hour, the supernatant fluid removed and again centrifuged ; no cells were discernible in stained preparations. For the cultivation experiments, equal parts of fresh rabbit serum, Tyrode solution and kidney extract were seeded with a testicular neuro-vaccine. The virus was sub-cultivated through ten generations and a total multiplication of 10^{20} was obtained.

The culture virus was neutralized by a vaccinal antiserum, while masses of " elementary bodies " were demonstrable in subcultures.—R. E. Glover.

Takebe, T., & Kodama, T. (1932). **Cataphoresis of a Purified Vaccinia Virus.**—*Kitasato Arch. Exp. Med.* **9.** 134-140. 6 tables. [16 refs.]

Previous studies on the charge carried by filtrable viruses have not taken into account the masking effect of associated protein material. With a view to overcoming this difficulty, the authors have purified vaccinia by adsorption on to kaolin and elution with buffered phosphate solution [Yaoi & Kasai, this *Bulletin.* **3.** 137 and 192].

The results showed that at pH 5·6 to 9·2 the virus carried a negative charge ; the isoelectric range was pH 9·3 to 9·6 ; at pH 9·7 and over the charge was positive. It was possible to remove the virus by cataphoresis from a mixture of virus and haemoglobin at pH 6·0, but it could not be separated from a mixture with tissue proteins (calf lymph or rabbit testicle).—R. E. Glover.

Nelson, J. B. (1932). **The Maternal Transmission of Vaccinial Immunity in Swine.**—*J. Exp. Med.* **56.** 835-840. 2 figs. on 1 plate, 1 table. [6 refs.]

These experiments were undertaken to determine whether immunity to vaccinia could be transmitted from sows to their young. The mothers were vaccinated shortly before breeding and the litters were divided into two batches : one group was permitted to suckle and the other was raised on a mixture of cows milk and normal swine serum.

In successive litters from three sows, there was a total of 34 young pigs of which 24 were allowed access to the dams while the remainder were hand fed. Twenty-three of the first group were completely immune to vaccinia applied to the skin within seven days of parturition, while the artificially reared pigs were susceptible to the virus.

It is suggested that the experiments establish the impermeability of the placenta for protective antibodies which are probably transmitted by way of the colostrum.—R. E. Glover.

Hindle, E. (1932). **An Attempt to Demonstrate Residual Virus in Monkeys which had recovered from Yellow Fever.**—*Brit. J. Exp. Path.* **13.** 135-140. [7 refs.]

" It is well known that in some diseases, *e.g.* many protozoal infections, fowl-pox, syphilis, rat-bite fever (*Spirillum minus*), etc., the persistence of a high degree of immunity is linked up with a residual infection, or carrier condition, in which the infective agent remains in the body, and is assumed in some way to reinforce the immune substances and make the subject resistant against reinfection. It seemed of interest, therefore, to see whether any evidence of the persistence of virus could be found in monkeys that had recovered from yellow fever, for if latent infections should exist, they would afford a possible explanation of the recurrence of epidemics in regions that have been apparently free from the disease for many years."

As the result of his experiments, Hindle came to the conclusion that monkeys, inoculated with suspensions of the tissue from brain, liver, kidney and spleen

of animals recovered from yellow fever, do not become infected, but that those receiving liver and spleen develop a transient immunity. In a single experiment, protection was conferred by the inoculation of washed leucocytes from an immune animal. This transient immunity has the duration of that produced by an immune serum alone and is probably passive in nature. Since even a strongly over-neutralized mixture of yellow fever virus and antiserum evokes an active immunity, these findings suggest that virus does not persist in the tissues of recovered monkeys. These observations will be of interest to those studying the immunology of rinderpest, foot and mouth disease, African horse sickness and other virus diseases of animals.—Ll. E. W. Bevan.

Kendrick, Pearl. (1933). **The Antigenic Properties of Bacteriophage Lysates of *Salmonella suipestifer*. I. General Introduction and Preliminary Study of Cultures and Lytic Filtrates. II. Rate of Disappearance of Injected Bacteriophage from the Blood Stream of Rabbits.**—*Amer. J. Hyg.* **17.** 297-317 and 318-328. 3 plates, 10 tables. [40 refs.]

I. This paper is a preliminary study of cultures of *Bact. suipestifer*, both a smooth and rough variant, and of the action of bacteriophage on each. The cultures are described and the lytic filtrate which was obtained from a sewage mixture containing chicken and pig faeces and pig pancreas. In addition to the phenomenon of lysis, the dissociative behaviour of cultures in the presence of bacteriophage was studied. The variant cultures obtained by the action of bacteriophage differed from the parent culture in cultural and antigenic properties and in virulence. The variants retained their properties in the absence of demonstrable lytic agents. Mucoid variants obtained from both smooth and rough cultures behaved similarly to smooth cultures regarding agglutination and sensitivity to bacteriophage. What is termed an " agglutinative " variant developed from the smooth strain and was shown to possess close antigenic affinities to the rough parent strain.

II. This paper records the attempts to get a quantitative picture of the rate of disappearance of bacteriophage from the blood stream of rabbits, after intravenous injection. After the first intravenous injection, bacteriophage showed slight reduction during the first hour and after that a progressive decrease in concentration, until after 36 hours it was no longer demonstrable in 0·2 c.c. quantities of blood. When injected into rabbits previously treated with bacteriophage, it was generally not detectable by the technique employed. Bacteriophage could not be passed through the unbroken skin, although it was easily demonstrated after intracutaneous inoculation.—R. Lovell.

I. Wollman, E., & Wollman, E. (1932). Recherches sur le phénomène de Twort-d'Herelle (Bactériophagie). [**Research on the Twort-d'Herelle Phenomenon (Bacteriophagy)**].—*Ann. Inst. Pasteur.* **49.** 41-74. 2 figs. [26 refs.]

II. Wollman, E., & Wollman, E. (1932). Recherches sur la nature chimique des Bactériophages. [**Research on the Chemical Nature of Bacteriophages**].—*C. R. Soc. Biol. Paris.* **110.** 626-627. [2 refs.]

III. Wollman, E., & Wollman, E. (1932). Lyse secondaire non bactériophagique du Staphylocoque. [**Non-Bacteriophagic Secondary Lysis of Staphylococci**].—*Ibid.* 636-638. [4 refs.]

IV. Wollman, E. (1932). Autolyse bactérienne et antiseptique. [**Bacterial and Antiseptic Autolysis**].—*Ibid.* **111.** 578-580. [1 ref.]

I. The authors describe their further investigations into the nature and mode

of action of the bacteriophage. Their findings, they consider, lend support to the hypothesis of hereditary factors as the only satisfactory explanation of the principal manifestations of bacteriophagy. They are of the opinion that the parasitic theory of the bacteriophage is now untenable.

II. In this paper the authors state that they have failed to demonstrate that lipoids play any part in the constitution of bacteriophages. They add, however, that their negative results may be attributable to the methods employed for extracting the lipoids.

III. Although one of the fundamental characters of the bacteriophage is that it only manifests itself at the expense of living and multiplying organisms, the authors demonstrate that a " transmissible lysis " can be shown to extend from staphylococci which have undergone lysis to dead staphylococci of the same strain in the same tube. The phenomenon can also be shown to extend under similar conditions to living staphylococci of a different strain and which are refractory to the bacteriophage. This lysis, they say, is not due to the direct action of the bacteriophage, but to certain products (diastases ?) which are liberated during bacteriophagy. In this transmission of lysis from sensitive to refractory organisms, the active principle, instead of reproducing itself as in the case of the bacteriophage, becomes gradually used up and its action becomes progressively weaker.

IV. Relatively small quantities of formalin, carbolic acid and mercuric chloride have been shown capable of causing lysis of *Bact. coli* and other organisms in broth, provided that the antiseptic is used in sufficiently small quantities and the cultures are young.

The author states that there appears to be a very close similarity between these findings and autolysis brought about by the bacteriophage.

—Gwilym O. Davies.

INVERTEBRATE VECTORS OF DISEASE.

Lester, H. M. O. (1932). **The Influence of Cyclical Transmission by *Glossina tachinoides* on a Strain of *Trypanosoma brucei*, made resistant to Human Serum.**—*Ann. Trop. Med. & Parasitol.* **26.** 525-537. 2 tables, 1 diagram. [15 refs.]

This paper records experimental work to ascertain whether the resistance to human serum acquired by a strain of *T. brucei* would be retained after cyclical transmission through tsetse, in view of the possibility that the trypanosomes pathogenic to man are modified strains of *T. brucei*. The strain of *T. brucei* used was isolated from wild *Glossina morsitans*, and when freshly isolated it was relatively avirulent for small laboratory animals. After a series of direct transmissions, the virulence was enhanced until the incubation period in mice was reduced to one to two days and death occurred in six to eight days. The intraperitoneal injection of 1 c.c. of human serum cleared the peripheral blood of infected mice in about eight hours and it remained clear for five days. The strain was rendered resistant to human serum by four injections of 1 c.c. of serum into mice, but it was found that on passage to the guinea pig the serum-fastness disappeared and resistance had to be increased by a series of passages, mice—guinea pigs—mice, the mice being treated with human serum until the strain exhibited serum-resistance in mice, even after passage through guinea pigs.

A series of 300 laboratory-bred *G. tachinoides* were fed on infected guinea pigs and then on clean guinea pigs. Only one transmission experiment was success-

ful, scanty infection appearing on the 45th day. On transference to mice, trypanosomes were so scanty that it was not possible to record qualitatively the effect of the administration of serum, but, as the intraperitoneal injection of 1 c.c. human serum did not cause the disappearance of trypanosomes, the serum resistance had been retained in spite of cyclical transmission. The cyclical transmission of the strain led to a decrease in virulence, the incubation period being increased to 11 to 15 days, and one animal living over six months without ever showing more than a scanty blood infection. The author concludes that mice must possess a defensive mechanism against pathogenic trypanosomes and that it may be misleading to use strains whose virulence has been exalted by direct transmission, and that to this may be due the classical picture of a steady uniform increase in the number of trypanosomes until death.—U. F. Richardson.

Whitnall, A. B. M. (1932). **The Trypanosome Infections of** *Glossina pallidipes* **in the Umfolosi Game Reserve, Zululand. (Preliminary Report.)**—*18th Rep. Direct. Vet. Serv. & Anim. Indust. Union of S. Africa.* Part I. pp. 21-30. 7 figs., 2 tables, 1 map. [4 refs.]

If trypanosomes were found in the proboscis only, flies were recorded as infected with *T. vivax*. If proboscis and gut were invaded, they were recorded as by *T. congolense*. If proboscis, gut and salivary glands were invaded, they were recorded as by *T. brucei*. The colonies of developmental forms of *T. vivax* in the labial cavity of the fly were compact and the colonies of *T. congolense* were diffuse. 50 per cent. of the infections were by *T. vivax*. *T. congolense* was next in prevalence and *T. brucei* was found in 5 out of 55 infected flies. The percentage of infected flies varied from 1·9 per cent. in some areas to 7·6 per cent. in others and the infectivity rate appeared to vary with the prevalence of game. If this relationship is accepted, the range of the fly is less than has been considered, as in one area 5·3 per cent. were infected and only two miles away only 2·8 per cent. was recorded. There appeared to be little seasonal variation in the rate of infection.

—U. F. Richardson.

Nieschulz, O. (1932). Over de Beteekenis van Bloedzuigende Insecten bij de Verspreiding van Miltvuur. [**On the Importance of Blood-Sucking Insects in the Spread of Anthrax**].—*Ned.-Indisch. Blad. Diergeneesk.* **44.** 46-51. [3 refs.] [Summary in German : abst. from orig.]

In connection with the serious outbreaks of anthrax which recently occurred in the Dutch East Indies, attention is drawn to the importance of bloodsucking insects, especially to Tabanidae, in the spread of the disease as they are prevalent in many parts of the territory. They are liable to transmit infection to buffaloes.

The circumstances are quite different in Europe and other countries where insects are less numerous.—B. J. C. te Hennepe (Rotterdam).

Bedford, G. A. H. (1932). **A Synoptic Check-List and Host-List of the Ectoparasites found on South African Mammalia, Aves, and Reptilia. (Second Edition).**—*18th Rep. Direct. Vet. Serv. & Anim. Indust. Union of S. Africa.* Part I. pp. 223-523. 26 figs., 1 table. [9 pages of refs.]

Bedford, in introducing the subject, gives details of the technique for collecting, preserving and mounting specimens of the different orders of ectoparasites. Keys are given, where possible, for the differentiation of the suborders, families, subfamilies and South African genera and species of the orders Acarina, Dermaptera, Anoplura, Hemiptera, Diptera and Siphonaptera. In dealing with the family Argasidae, which has previously comprised the two genera *Argas* and *Ornithodorus*,

Bedford considers it necessary to sink *Ornithodorus* as a synonym of *Argas*.

Host-lists are given of the ectoparasites found on human beings and domestic animals, domestic birds, South African mammals, South African birds and South African reptiles.

A table is also given of the diseases transmitted by South African ectoparasites.

—J. S. Steward.

DISEASES CAUSED BY METAZOAN PARASITES.

Symes, C. B., & Roberts, J. I. (1932). **A List of the** *Muscidae* and *Oestridae* **Causing Myiasis in Man and Animals in Kenya, Recorded at the Medical Research Laboratory, Nairobi.**—*East Afric. Med. J.* **9.** 18-20.

Among the records in animals are :—*Cordylobia anthropophaga* as a common cause of cutaneous myiasis of rats and dogs ; *Stasisia* (*Cordylobia*) *rodhaini* from rodents ; *Oestrus ovis* from the nasal cavities of sheep and *O. variolus*, *Gedoelstia cristata* and *G. hassleri* from the nasal cavities of Coke's hartebeeste.

—J. S. Steward.

I. Zaubzer, T. (1932). Die Auswirkung einer sachgemäss durchgeführten Dasselfliegenbekämpfung. **[The Effect of a Systematic Campaign against Warble Flies].**—*Münch. tierärztl. Wschr.* **83.** 605-606. 2 figs., 1 table. [5 refs.]

II. Kögel, A. (1933). Zur Frage der Immunisierung gegen Dasselkrankheit. **[Immunization against Warble Flies].**—*Ibid.* **84.** 62-65. [21 refs.]

I. The author refers to the report of the Skjaerum Dairy Association in Jutland on the campaign against warble flies from 1902 to 1910 and compares the results obtained with that of a campaign started during 1929 to 1932 in the Garmisch district in the Bavarian Alps. In Jutland the number of larvae killed dropped from 29,790 in 1902 to 3,815 in 1910, a reduction in the infestations of 82·7 per cent. within eight years. In the Garmisch district the average reduction of infestations was as high as 87·3 per cent. within three years. The results are shown in a graph. The larvae were removed by means of the crochet hook method. Removal was performed five to six times in 1929 and once or twice in the following years. The author points out the danger of untreated cattle being near the borders of controlled areas.

II. Kögel reviews previous work on the formation of specific antibodies as a result of infestation with metazoan parasites. In this connection he reports the presence of specific precipitins in the blood of a calf, born of a non-infected mother, which was suckled on a dam infected with *Hypoderma bovis*. In the author's opinion, the absorption of antibodies through the mucous membrane of the intestine points to the possibility of immunizing calves against warble flies *per os*. He believes that an active immunity can be conferred by feeding extracts of larvae. He wishes to stimulate research workers to take up this matter and outlines the experiments which should be carried out. With regard to the technical details the original article must be consulted.—R. Wetzel (Hanover).

I. Terada, B., & Ono, S. (1932). **The Toxicological Investigation in the Toxic Substance obtained from the Larvae of** *Hypoderma* **sp. of Mongolian Cattle at the Esophageal Stage.**—*Orig. Contrib. Mukden Inst. Infect. Dis. Anim.* **2.** 191-198. 7 figs. on 3 plates.

II. Ono, S. (1932). **Studies on "Hypodermatotoxin," Toxin Obtained from**

the Larvae of *Hypoderma* sp. at the Esophageal Stage. I. Its Action on the Blood Coagulation. II. Biologic Significance of Hypodermatotoxin from Point of View of its Haemorrhagenic and Dermolytic Actions.—*Ibid.* 199-215 and 217-226. 5 figs. on 1 plate, 25 tables. [11 refs.] [Orig. in Japanese : abst. from authors' summaries].

I. Terada and Ono show that the larvae of *Hypoderma* sp. from the submucosa of the oesophagus contain a very toxic fluid which causes symptoms of anaphylactic shock when injected intravenously into rabbits. The alcohol or ether precipitate, if dried, retains its toxicity for several months and the minimum lethal dose of this precipitate was found to be from 3 to 5 mg. per kg. when injected intravenously into rabbits.

II. *In vitro* a small amount of the toxin was found to accelerate the coagulation of citrated plasma whereas inhibition of coagulation occurred with large amounts of the toxin.

In rabbits receiving a small quantity of this toxin intravenously, blood coagulum was found in large masses in the heart and the coagulability of the blood remained unchanged. However, after the injection of a large quantity, coagulation did not occur. Heating the toxin at 70° to 75°C. for 30 minutes destroys the action of inhibiting coagulation, but not that of accelerating coagulation ; this, however, was considerably affected by heating at 80°C. for half an hour.

The intracutaneous injection into guinea pigs of a 2 per cent. solution of the dried toxin dissolved in physiological saline had a dermolytic action and caused perforation of the skin. For cattle, a 30 per cent. solution was necessary to cause perforation of the skin. The original toxic fluid from the larvae [as opposed to a solution of the dried alcohol or ether precipitate] acted on the skin of cattle in a similar manner though far more rapidly.

The subcutaneous and intraperitoneal injection of the toxin caused haemorrhage and local destruction of the tissues.

The writer concludes that it is certain that the perforation of the skin of cattle by *Hypoderma* larvae is caused by the dermolytic action of hypodermatotoxin.

—J. S. Steward.

du Toit, R., & Nieschulz, O. (1933). *Musca crassirostris*, **A Bloodsucking Fly New to South Africa.**—*J. S. Afric. Vet. Med. Ass.* **4.** 97-98. 1 fig. [5 refs.]

The writers record the occurrence of *Musca crassirostris* Stein on horses at Onderstepoort in South Africa, where it was quite as common as *Stomoxys*. It is a true bloodsucking species of *Musca* and it has been shown in the Orient that this species is capable of mechanically transmitting surra and haemorrhagic septicaemia to laboratory animals.—J. S. Steward.

Holdaway, F. G., & Smith, H. F. (1932). **A Relation Between Size of Host Puparia and Sex Ratio of *Alysia manducator* Pantzer.**—*Austral. J. Exp. Biol. & Med. Sci.* **10.** 247-259. 8 tables, 3 charts. [16 refs.]

The writers show that there is a relationship between the size of the host puparia and the sex ratio of the Braconid parasite *Alysia manducator*. Small puparia produce a high proportion of males and large puparia a high proportion of females. In the observations recorded the hosts were *Lucilia sericata* Meig, *Calliphora erythrocephala* Meig, *Calliphora vomitoria* Linn and species of *Sarcophaga*.

—J. S. Steward.

Lewis, E. A. (1933). *Rhipicephalus ayrei* **n.sp. (a Tick) from Kenya Colony.**—*Parasitology*. **25.** 269-272. 2 figs. [1 ref.]

Rhipicephalus ayrei n. sp. is described. The material was obtained from the abdomen of buffaloes and from a lion and a rhinoceros.—J. S. STEWARD.

—. (1933). **Report of Committee on Parasitic Diseases.**—*J. Amer. Vet. Med. Ass.* **82.** 517-524. [1 ref.]

This report is a general summary of information available regarding the prevalence of parasitic diseases and the measures which are being employed in connection with their control in the various American states. It contains a summary of the results of investigations reported upon during the preceding year. —R. S. ROBERTS.

LE ROUX, P. L. (1933). **A Preliminary Note on *Bilharzia margrebowiei*, a New Parasite of Ruminants and possibly of Man in Northern Rhodesia.**—*J. Helminthol.* **11.** 57-62. 1 fig. [7 refs.]

LE ROUX here describes yet another new species of bilharzia which he has found in the portal vein of a number of wild and domesticated ruminants in Central Africa. The eggs are practically oval in outline and provided with a small subterminal spine, which in some instances is rudimentary.—E. L. TAYLOR.

I. HARPER, W. F. (1932). **On Some British Larval Trematodes from Terrestrial Hosts.**—*Parasitology.* **24.** 307-317. 13 figs., 4 tables. [10 refs.]

II. ARCHIBALD, R. G., & MARSHALL, A. (1932). **A Study of some Cercariae obtained from Molluscs in the Sudan.**—*Ibid.* 344-349. 5 figs. on 1 plate.

III. RAO, M. A. N. (1932). *Cercaria saundersi*, **n.sp.**—*Ind. J. Vet. Sci. & Anim. Husb.* **2.** 255-258. 2 figs. on 1 plate. [4 refs.]

IV. RAO, M. A. N. (1932). *Cercaria kylasami*, **sp.nov.**—*Ibid.* 259-261. 3 figs. on 1 plate. [1 ref.]

V. VOGEL, H. (1932). Ueber den ersten Zwischenwirt und die Zerkarie von Opisthorchis felineus Riv. [**On the First Intermediate Host and the Cercaria of *Opisthorchis felineus* Riv.**].—*Arch. Schiffs- u. Trop.-hyg.* **36.** 558-561.

I. Five larval trematodes from Scottish terrestrial molluscs are here described, *Cercariaeum helicis* Braun from *Helix hortensis*, and four new species named *C. politae alliariae*, *C. politae nitidulae*, *C. politae lucidae* and *C. lauriae cylindraceae* corresponding to the names of the hosts in which they were found.

II. The authors describe five species of furcocercous cercariae encountered during investigations on the intermediate hosts of schistosomes in the Sudan; these are referred to as *Cercaria sudanensis* Nos. 4, 5, 6, 7 and 8.

III. The author describes a new furcocercous cercaria of the " Elvae group " described by MILLER (1927) from *Limnea acuminata* and proposes the name *C. saundersi*. Attempts were made to infect a white rat, a fowl and a frog (*Rana tigrin*), but with negative results.

IV. In this paper a cercaria is described from *Planorbis exustus*; it is referable to the " Diplocotylea group " as described by SEWELL (1922) and appears to be new to science. The name *C. kylasami* is proposed.

V. Fifteen kinds of water snails were tried without producing any result, but development of cercariae was at last obtained in *Bithynia leachi*. The eggs of *O. felineus* will not hatch until they reach the intestine of the mollusc when the miracidium comes out and penetrates the intestinal wall, rediae develop and finally make their way to the digestive gland. The cercariae leave the rediae and lie free in the digestive gland for some time before swarming, this occurring at midday and for some little time afterwards. The cercaria is described.—E. L. TAYLOR.

I. Neumüller. (1932). Echinococcus granulosus (Taenia echinococcus) beim Fuchs, ein Beitrag zur Enstehung der Hülsenwurmkrankheit. [*Echinococcus granulosus* **in the Fox, a Contribution on the Origin of Hydatid Disease**].—*Zschr. Fleisch- u. Milchhyg.* **43.** 3-4. [5 refs.]

II. Monserrat, J. L. (1932). Hypertrophie déformante de la membrane chitineuse d'un kyste hydatique. [**A Deforming Hypertrophy of the Chitinous Membrane of a Hydatid Cyst**].—*C. R. Soc. Biol. Paris.* **111.** 75-77. 1 fig. [3 refs.]

I. A wild fox which had been shot because it appeared to be diseased was found to be heavily infested with several kinds of parasitic worms, *Eucoleus aerophilus*, *Crenosoma vulpis*, *Capillaria plica*, *Uncinaria stenocephala*, *Toxocara canis*, *Taenia taeniaeformis* and *Echinococcus granulosus* being found. The author points out the importance of the fox in the dissemination of hydatid disease.

II. There have been four previous reports of localized hypertrophy of the outer membrane of the hydatid cysts. In this instance nodules were observed varying in size from that of a millet seed to that of a grain of maize and showing striations on section.—E. L. Taylor.

Kuipers, K. R. (1933). Cysticercose bij het Schaap. [**Cysticercosis in a Sheep**].—*Tijdschr. Diergeneesk.* **60.** 68.

A case record of severe infestation of a sheep killed for food purposes. The parasite was thought to be *Cysticercus ovis*, the scolices possessing from 24 to 36 hooks. Nearly all the muscles of the body were infested.—J. E.

Leinati, L. (1933). Le lesioni aortiche da Spiroptera sanguinolenta (Rud.) nel cane. [**Aortic Lesions from** *Spiroptera sanguinolenta* **(Rud.) in Dogs**].—*Nuovo Ercol.* **38.** 1-13, 33-39 and 50-60. 12 figs. on 2 plates. [30 refs.]

The presence of *Spiroptera sanguinolenta* in the walls of the thoracic aorta in dogs has been reported by a number of authors and several have reported this infection as the cause of aneurism. Haythorn, Pittsburg and Ryan, on the basis of microscopic observations of three cases of infection, concluded that the regressive changes of the spiropteric nodules in the walls of the aorta are the cause of the aortic aneurism.

The author has carried out macroscopic and microscopic observations on ten cases of spiroptera infection of the aorta in dogs and comes to the following conclusions :—

Spiroptera sanguinolenta when in the larval stage is the cause of nodular aortic alterations ; these lesions he calls parasitic aortitis from spiropterosis.

The presence of the larva in the adventitia produces proliferation of connective tissue surrounded by cellular infiltration and oedema. After the migration of the larva in the blood stream there is a hyaline degeneration of the newly formed connective tissue which gradually disappears, decreased resistance of the aortic wall, formation of a cavity as a result of the blood stream pressure, and the formation of typical aneurisms.—F. Veglia (Turin).

Mazza, S., & Romana, C. (1932). Comprobación de *Setaria equina* Abildgaard 1789 en caballos del Chaco santafesino. [**Confirmation of the Existence of** *Setaria equina* **in Horses in the Santa Fé Chaco**].—*7a. Reun. Soc. Argent. Pat. del Norte.* 1032-1035. 1 plate.

The existence of *Setaria equina* in the Santa Fé Chaco region was reported in 1910, but, as no further reports had appeared, the authors thought it possible that it had originally been identified in imported horses. They have definitely

established the fact that it is indigenous in the district, as they have found the microfilaria in the blood and the adult parasites in the peritoneal cavity of native horses.—R. S. Roberts.

Mönnig, H. O. (1933). **Wild Antelopes as Carriers of Nematode Parasites of Domestic Ruminants—Part II.**—*18th Rep. Direct. Serv. & Anim. Indust. Union of S. Africa.* Part I. pp. 153-172. 27 figs., 2 tables. [12 refs.]

A description is given of a new genus of Metastrongylidae named *Bronchonema* to receive the new species *B. magna* found in the smaller bronchi of the blesbuck *Damaliscus albifrons*. Five other new species are also described :—*Trichostrongylus minor* from *D. albifrons*, *Cooperia hungi* and *Ostertagia hamata* from *Antidorcas marsupialis* and *Ovis aries* ; *Skrjabinema alata* from *Ovis aries* and *S. africana* from *Rhaphiceros campestris*. It is proposed to divide the genus *Skrjabinema* into two sub-genera on the structure of the lips and mouth capsule.

Haemonchus contortus, *Trichostrongylus falculatus*, *Impalaia nudicollis* and *Bigalkea albifrontis* were successfully transmitted from the blesbuck to sheep. Several species of trichostrongyloid nematodes were also successfully transmitted from sheep to the blesbuck.—E. L. Taylor.

Low, G. C., Manson-Bahr, P. H., & Walters, A. H. (1933). **Some Recent Observations on Filarial Periodicity.**—*Lancet.* **224.** 466-468. 5 charts. [9 refs.]

Hourly observations carried out on the blood of a patient infected with *Filaria bancrofti* gave clear evidence of the nocturnal periodicity of the microfilariae in the peripheral circulation. The number of microfilaria was found to be remarkably constant at the same hours on three different occasions, separated by monthly intervals. The normal increase in the number of microfilariae from 4 p.m. to 2 a.m. was found to be disturbed in interrupted sleep and to fall immediately the waking state is entered upon.—E. L. Taylor.

IMMUNITY.

I. Seibert, Florence B. (1932). **Chemical Composition of the Active Principle of Tuberculin. XVI. Local Cutaneous Sensitization (Arthus' Phenomenon) Produced in Normal Rabbits and Guinea Pigs by the Protein of Tuberculin.**—*J. Infect. Dis.* **51.** 383-406. 4 plates, 4 tables. [37 refs.]

II. Seibert, Florence B., & Morley, Nelle. (1933). **The Relationship of the Tuberculin Proteins of Different Acid-Fast Bacilli to Sensitization as Indicated by Their Reactivity in Sensitized Animals.**—*J. Immunol.* **24.** 149-156. 2 tables. [7 refs.]

I. In this article it is shown that the tuberculin skin responses of guinea pigs inoculated with different strains of human tubercle bacilli corresponded fairly closely with their virulence. In order to determine whether the more infective strains contained an antigen of higher sensitiveness, tuberculo-proteins were prepared by the trichloracetic acid and ultrafiltration method [see this *Bulletin*. **3.** 260]. When tested on sensitized guinea pigs, each possessed the same degree of potency.

Proteins extracted from bovine, avian and timothy grass strains could be differentiated by a quantitative skin test in guinea pigs sensitized by the inoculation of a human type.

II. The repeated injection of purified tuberculo-proteins into rabbits and

guinea pigs was capable of inducing a specific cutaneous sensitization to the homologous antigen. This response simulated an ordinary tuberculin reaction in the tuberculous subject. The authors consider that previous failures to elicit phenomena of the Arthus' type are due partly to the small doses of protein which have been injected and partly to a modification of the protein by heat. These difficulties can be overcome by the use of ammonium sulphate or trichloracetic acid precipitates of unheated tuberculin.—R. E. Glover.

I. Ustvedt, H. J. (1932). Étude des réactions obtenues avec la tuberculine. [**Tuberculin Reactions**].—*Rév. Tuberc.* **13.** 121-145. 3 text figs.

II. —. (1932). **Tuberculin in Diagnosis.**—*Brit. Med. J.* Aug. 6th. 261-262. [Discussion at the Section of Tuberculosis of the Centenary Meeting of the British Medical Association, London, 1932].

I. The author summarizes the evidence in favour of v. Pirquet cutaneous and Mantoux intracutaneous tuberculin tests respectively. While admitting that the latter test has often yielded the better results, he suggests that the v. Pirquet is frequently misapplied and that, with careful attention to detail, the two methods should give parallel results. He points out that, in a small percentage of cases, non-specific reactions are liable to occur, but considers that these can be differentiated by the rapidity of their evolution. He is opposed to the inoculation of concentrated glycerine broth as a measure of control on the grounds that, in addition to the specific substance, tuberculin contains non-specific agents elaborated during the growth of the organisms which are not present in the broth.

II. In the Section of Tuberculosis at the Centenary Meeting of the British Medical Association, Lyle Cummings and D'Arcy Hart presented their views on the value of cutaneous tuberculin tests in diagnosis [see this *Bulletin*. **3.** 210].

In the subsequent discussion several speakers stressed the desirability of using purified forms of tuberculin with a view to obtaining more accurate results.

—R. E. Glover

Gardner, A. D., & Stubington, Edith F. (1932). **Granular " O " Agglutination in Paratyphoid B and Typhoid Fevers.**—*J. Hyg. Cambridge.* **32.** 516-522. 2 tables. [5 refs.]

An enquiry into the value of the use of " O " suspensions for the diagnosis of enteric fever by the agglutination test has been carried out by titrating samples of human serum from 80 cases of typhoid and paratyphoid fever. Formolized broth suspensions of a non-motile " O " variant of *Bact. typhosum* and similar preparations of a non-motile " O " variant of *Bact. aertrycke* were prepared. The latter was used in place of *Bact. paratyphosum* B as no non-motile variant was available and the heat-stable somatic antigens of *Bact. paratyphosum* B and *Bact. aertrycke* have been shown to be identical. As no permanent non-motile variant of *Bact. paratyphosum* A is yet available, alcohol-treated suspensions of smooth motile agar cultures were used.

The preliminary testing of 50 samples of normal human serum indicated that the typhoid " O " suspension was reacted on at a higher level and more frequently than the paratyphoid B " O " suspension ; and that the paratyphoid A " O " suspension was not reacted upon at all at a dilution of 1 : 25.

In the 40 samples of serum from typhoid patients, the titres for *Bact. typhosum* " O " ranged from 1 : 125 to 1 : 5,000, and for *Bact. paratyphosum* B " O " from 0 to 1 : 250.

In the 40 samples of serum from paratyphoid B patients, the titres for *Bact. typhosum* " O " ranged from 0 to 1 : 600, and for *Bact. paratyphosum* B from 0 to

1 : 2,000. They were on an average 1·6 times higher than the typhoid titres.

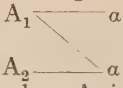
In spite of this overlapping, the authors point out that the paratyphoid B suspensions react at a definitely lower level with normal serum and that failure to recognize this is to magnify the apparent typhoid titres and to create an error in favour of a typhoid diagnosis. They maintain that the employment of " O " suspensions is a useful supplement to the use of " H " suspensions for diagnosis and seek to correlate the somewhat opposing views of FELIX and WHITE. FELIX finds largely group reactions when working with human sera and typhoid and paratyphoid B " O " suspensions, whilst WHITE in his experiments with rabbit immune serum finds only minor and variable cross-agglutination.—R. LOVELL.

I. SCHERMER. (1932). Neues über die Blutgruppen bei den Haustieren. [**Recent Knowledge on Blood Groups of Domestic Animals**].—*Tierärztl. Rdsch.* **38.** 859-861. [10 refs.]

II. RINGSEISEN, J. (1932). Die Blutgruppenforschung bei Mensch und Tier und ihre praktische Bedeutung. [**The Blood Groups of Man and Animals and their Practical Importance**].—*Münch. tierärztl. Wschr.* **83.** 601-605. [45 refs.]

I. This lecture, given to a society in Wiesbaden, deals first with the work of Landsteiner who showed the presence of four blood groups in man and their constitution, namely two different antigens A and B and corresponding agglutinins α and β. The four main groups are therefore (1) $0\alpha\beta$, (2) $A\beta$, (3) $B\alpha$, (4) ABo.

In animals it is pointed out that in addition to the antigen-antibody combination $A\alpha$ found in swine, sheep and cattle, the author and his colleagues have found the antigen-antibody combinations $B\beta$. In horses, four main groups appear to be the common scheme with a large number of irregular reactions. This is partly explained by the conclusion that there are two types of A antigen and two types of α antibody, namely A_1 and a lesser A_2 antigen, a strong α and a weak α_1 antibody. Their reactions are shown in the following scheme :—



Whereas A_1 is reacted upon by α and α_1, A_2 is affected only by α. In addition two further antigens, namely X and Y, and their corresponding antibodies have been noted, these being responsible for some of the subgroup reactions.

The genetic aspect of blood grouping is discussed and the uses to which it might be put in animal medicine and physiology.

II. The history of blood grouping in man and animals is reviewed, the four main groups in man pointed out, and the uses to which this knowledge has been put in surgery and medicine. In animals the work of various authors would indicate the lack of grouping in mice and rats, three or four groups in rabbits, three in fowls, none in cats and five main with fourteen subgroups in dogs. Three blood groups have been described in sheep and also in pigs, none in goats, whilst there appears to be a difference of opinion as to whether cattle have three or four groupings. The four main groups in horses are referred to and the importance of the study of blood grouping in animals is emphasized. It is suggested that the ineffectiveness of certain cases of serum therapy might be explained along these lines.—R. LOVELL.

ANDERSON, J. (1932). **Blood Grouping in Man and Animals with Special Reference to its Occurrence in the Equine.**—*Vet. Rec.* **12.** 691-698. 5 tables. [42 refs.]

The literature on blood grouping in man and in animals is reviewed and the observations on blood reactions in samples from 61 horses are recorded. A macroscopic iso-agglutination technique was adopted and four blood groups could be differentiated :—group 0, 24·59 per cent., group A, 31·15 per cent., group B, 37·70 per cent. and group AB 6·56 per cent. of the animals which fell into those groups. Eight animals examined could not be grouped in the manner indicated and are evidently not included in the group percentages recorded by the author. The findings are discussed with a view to any possibility of using blood group reactions as a means of differentiating breeds of animals.—R. Lovell.

Galea, M., & Falchetti, E. (1932). Le phénomène de l'anachorèse et les anticorps. [**The Phenomenon of Anachoresis and Antibodies**].—*C. R. Soc. Biol. Paris.* **109.** 291-293.

The authors tested the possibility of the production of agglutinin and haemolysin being influenced by the presence of localized inflammatory reactions in guinea pigs. However, they obtained no evidence of it except that these antibodies possibly tended to disappear more quickly in the animals with localized lesions than in the controls. No evidence of the presence of agglutinin or haemolysin could be found in extracts of the inflammatory lesions.—A. Leslie Sheather.

Grove, Ella F. (1932). **Studies on Anaphylaxis in the Rabbit. I. A Study of the Factors Concerned in the Establishment of Maximal Hypersensitiveness in Rabbits to Egg White and Horse Serum. II. A Study of the Effect of Histamine, Barium Chloride and Epinephrine on Unstriped Muscle of the Guinea Pig and Rabbit. III. On the Sensitization of Rabbits with Fowl Corpuscles. IV. On the Simonds Explanation of the Different Pathology of Acute Anaphylactic Shock in Different Animal Species. V. On the Rôle of Unstriped Muscle in Acute Anaphylaxis in the Rabbit.**—*J. Immunol.* **23.** 101-123, 125-138, 139-145 and 147-152. 6 figs., 16 tables, 12 charts. [22 refs.]

I. Investigators have previously found difficulty in pursuing studies on anaphylactic shock in the rabbit owing to the lack of regularity in the production of sensitization by the methods employed.

The author has made a large number of experiments to observe the effect of variations in dosage, route of administration and spacing of injections on the degree of sensitization produced. Optimal sensitization was attained with the following series of injections :—1st injection : 1·0 c.c. of 50 per cent. egg white, intravenously ; 2nd injection (5th day) : 5 c.c. undiluted egg white, intraperitoneally ; 3rd injection (10th day) : 5 c.c. undiluted egg white, intraperitoneally ; 4th to 10th injection (on successive days) : 1 c.c. undiluted egg white, intraperitoneally ; 11th injection (18th day) : 1·5 c.c. of undiluted egg white, subcutaneously. The shock test dose was 5 c.c. of 50 per cent. egg white given intravenously seven days after the last injection. Of 53 rabbits treated with this series of injections with egg white, 37 (70 per cent.) proved to be fully sensitized, 3 (5·6 per cent.) showed slight symptoms of anaphylaxis and 13 (24 per cent.) failed to respond to the test inoculation. Similar results were obtained with horse serum as antigen. The results of precipitin tests and passive sensitization tests in guinea pigs showed that the development of a maximal sensitization in the rabbit was associated with the formation of precipitating and sensitizing antibodies, but no quantitative relationship between precipitin formation and the degree of sensitivity existing could be established. [The precipitin test used however was the " ring " test, not the optimal proportions method]. The observation was made that the development

of the Arthus phenomenon was by no means a criterion of a high general sensitiveness.

II. The author considered that the refractoriness of a proportion of rabbits to sensitization with egg white or horse serum (see I) might be due to a relative lack of sensitivity of tissues such as arterial musculature (" arterial shock tissue ") and that this might coincide with a similar failure of this tissue to respond to the action of histamine, barium chloride and epinephrine. No evidence was obtained that failure of effective sensitization in the rabbit was at all related to the relative sensitivity of different animals and different tissues in the same animal to the action of these chemical substances. In a test made with barium chloride, for example, certain rabbits, which proved refractory to the shock dose of egg albumin after the requisite series of sensitizing injections had been administered, were subsequently inoculated with a 2·5 c.c. dose of a 10 per cent. solution of barium chloride and all succumbed to the inoculation ; two of these which were tested by perfusion of the pulmonary circulation showed a characteristic obstruction of the pulmonary vessels. It was found that, while the same chemical substance usually produced the same qualitative effect upon the unstriped muscle of the same organ in the guinea pig and the rabbit, the action of a given substance upon the isolated unstriped muscle in the bath was not always reflected in the pharmacological effect of that substance upon the same tissue in the living animal.

III. A series of observations on the anaphylactic sensitization of rabbits to a corpuscular antigen are recorded. The antigen used was a suspension of washed fowl corpuscles. Of 20 rabbits that received two injections, the first intravenously and the second subcutaneously, of fowl corpuscles at an interval of five days, all were found to possess a maximal sensitiveness to the intravenous inoculation of a large dose, 5 c.c. of washed and sedimented cells, seven days later. Rabbits so sensitized are not necessarily sensitive to the water-soluble substance derived from the corpuscles. The subcutaneous reinjection of a corpuscular antigen (fowl corpuscles) into rabbits almost always leads to the appearance of the typical Arthus phenomenon. It is suggested that this reaction in the case of a corpuscular antigen seems to be dependent upon the same factors that govern the induction of the general sensitivity.

IV. & V. The author has tested the response of preparations *in vitro* of spiral strips of bronchus and of pulmonary artery, removed from sensitized guinea pigs and rabbits, to the specific antigen. Specific contraction of both strips of bronchus and pulmonary arterial strips was obtained in the case of the guinea pig. Specific contractions were usually obtained with the strips of rabbit pulmonary artery, but not with those of the bronchus. Experiments with histamine led the author to suggest that this failure to respond might be due to the small amount of muscular tissue in the rabbit's bronchus. This suggestion is made with reservation, since it is also admitted that the guinea pig bronchial strip showed distinct specific contraction, although the reaction to histamine was hardly as great as that of the rabbit bronchial strip.

Mainwaring has denied the participation of unstriped muscle in the acute anaphylactic shock in the rabbit arguing from evidence of the presence of bladder contraction in the anaphylactic guinea pig and its absence in the anaphylactic rabbit. The author has shown that, as a result of asphyxia produced by ligation of the trachea under an anaesthetic, in both guinea pigs and rabbits, contraction of the bladder occurs. It is suggested that the results of the experiments justify the conclusion that the bladder of the rabbit does not contract in anaphylactic shock because there is no respiratory asphyxia in contradistinction to what obtains in the case of the sensitized guinea pig.

The author concludes that the experiments recorded in this paper confirm

the role of unstriped muscle in acute anaphylactic shock in the rabbit and are in accordance with the view of SIMONDS and WELLS, that the difference in the pathology of acute anaphylaxis in the guinea pig and rabbit is due to differences in the structural relations in the respective organs affected.—I. A. GALLOWAY.

LEWIS, J. H. (1933). **The Immunologic Specificity of Brain Tissue.**—*J. Immunol.* **24.** 193-211. 16 tables. [4 refs.]

There are few tissues in the body for which a specific antiserum has not been sought and up to the present no other tissue can be compared with the crystalline lens in the degree of its specificity as an antigen.

Recent experiments have indicated that brain tissue possesses similar antigenic properties to a high degree and in this paper the author gives an account of experiments which confirm this view.

The methods by which antigens are prepared and animals immunized together with the technique of complement-fixation reactions are given in detail.

—GWILYM O. DAVIES.

GORDON, J., & THOMPSON, F. C. (1933). **The Parallel Action of Neutral Salts on the Inhibition of Complement and on the Dispersion of Gelatin.**—*Brit. J. Exp. Path.* **14.** 33-42. 8 tables. [9 refs.]

A study has been made in this paper of the action of neutral, non-hydrolysable salts of sodium and potassium on the inhibition of complement and the results give an anion series similar to the lyotrope series for the salt effects in the swelling of purified gelatin at low concentrations of salts. It is argued from this that, under the conditions of the experiments described, a dispersion of the serum proteins is the most probable cause of the inhibition observed and that complement activity is necessarily associated with a particular state of aggregation of the serum proteins.—EDWARD F. PECK.

DISEASES, GENERAL.

BARTHELÉMY, G. C. (1932). Histoires médicales épizootiques & agricoles au pays de Vôge, Lorraine, Alsace et frontière des Allemagnes depuis les temps historiques jusque vers la fin du XIXe Siècle. [**An Historical Account of Outbreaks of Diseases in the Vosges, Alsace-Lorraine and the Neighbouring Frontier States**].—*Thesis for Docteur vétérinaire, Alfort.* pp. 301. 1 table. [4 pages of refs.]

A highly interesting and well documented account of the numerous scourges affecting human beings and domestic animals in the states bordering on the German frontier from early times to the end of the nineteenth century.

The thesis is divided into many sections of which the following are of major interest to the veterinarian :—rinderpest, foot and mouth disease, anthrax, black-quarter, rabies, mange, tuberculosis, sheep pox, infectious anaemia, pleuro-pneumonia, pig diseases, jurisprudence, meat inspection, etc.

The existence of rinderpest is mentioned as far back as the year 810 and severe outbreaks occurred throughout the following centuries. At an early date, the plugging of the natural orifices was recommended to prevent the spread of infection—a striking anticipation of the modern conception that many virus affections establish themselves by the naso-pharyngeal mucous membranes, while in 1745 strict regulations were enforced to prevent traffic in hides from infected animals. In 1779 it was enacted that animals affected with glanders, and considered

incurable, should be slaughtered and instructions were issued for the destruction of harness, etc. The parasitic causation of equine mange was suggested in 1760 while the value of flowers of sulphur as a curative agent was generally recognized at the end of the eighteenth century.

Under the heading of Food Inspection, it is of interest to note that very minute instructions were laid down in the fourteenth to sixteenth centuries for the seizure of infected products and many of these measures were in close agreement with modern legislation.—R. E. Glover.

Minett, F. C. (1932). **Diseases of Animals : Prevention and Treatment.**—*Farmer's Guide to Agric. Res.* 1931. 24-49. [17 refs.]

In accordance with the aims of the volume as a whole [which in previous years has gone under the name of " Agricultural Research "] the author gives a critical review of the more recent developments in connection with certain selected diseases.

Foot and Mouth Disease.—Attention is given to the length of survival of the virus in dried blood, in various parts of carcasses and offal, in their wrappings and in hides ; its survival in dried milk, and the effect on it of freezing and thawing. Sources of infection are discussed under the following headings :—initial outbreaks and infection during outbreaks, susceptible farm animals and small animals (rats, rabbits and hedgehogs) being considered.

Immunization of Pigs against Swine Fever.—The relative merits of a slaughter policy, of sanitary measures including proper disposal of carcasses, quarantine and disinfection, and of immunization are discussed. The conclusion is reached that slaughter and sanitary measures are only applicable in isolated outbreaks. In heavily infected districts, particularly if they carry a large swine population, police control must be supplemented by serum immunization or by the simultaneous method which is finding favour in most badly infected countries.

Intestinal Disorders of Calves.—White scours or infectious diarrhoea is considered under the headings of aetiology, the importance of colostrum and prevention in general ; its nature and various manifestations and the role of *Bact. coli* are fully discussed. The high value of colostrum and the distinct but relatively lower value of normal serum, or, better, immune serum is stressed.

Vibrionic enteritis (winter scours, black scours). The work of Jones and Little, who recently described the disease and attributed it to an organism which they called *Vibrio jejuni* is summarized. It affects both adult cattle and calves, occurs during autumn and winter, and is usually chronic but not fatal. The faeces are blackish and liquid. The condition can be transmitted to young healthy calves by feeding them with faeces or by allowing them to mix with older infected calves. Apparently the disease often remains quite mild for a long period, and infection may be introduced in this way.—A. W. Stableforth.

Hieronymi, E. (1933). Ueber die Haffkrankheit des Menchen und der Tiere. [**" Haff Disease " in Men and Animals**].—*Deuts. tierärztl. Wschr.* **41.** 1-5. [5 refs.]

Cats in the neighbourhood of the Frisches Haff have become ill after eating putrid fish and some of the symptoms are like those of the so-called " Haff disease " in man. The same symptoms may, however, be produced by other causes, and the haemoglobinuria which is pathognomic for " Haff disease " in man is rarely found in cats. Histological diagnosis from changes in kidney and liver is also very uncertain and it is doubtful in fact if there is a definite disease properly termed " Haff disease " of cats.—F. Bullock.

—. (1933). **Memorandum as to Diseases affecting Milk Cattle.**—*J. Scot. Chamber Agric.* **14.** 49-57.

In response to a request made by the Committee of the Economic Advisory Council appointed to report on diseases among milk cattle, the Scottish Chamber of Agriculture has submitted a memorandum showing the losses caused to stock owners in Scotland by tuberculosis, contagious abortion and mastitis, describing the present statutory remedies and indicating their defects.

(1) In regard to tuberculosis, the Milk and Dairies Act, 1914, and the Tuberculosis Order of 1925 cannot lead to eradication of the disease, which could only be achieved by (a) Bang's method ; (b) Calmette's method or (c) a combination of these, and the Committee is urged to investigate the practicability of these methods.

(2) Bovine contagious abortion : here also the defects of the Epizootic Abortion Order of 1922 are pointed out and further investigation suggested.

(3) Mastitis : similarly, after describing the serious losses caused by this disease and the measures that have been tried to cope with it, it is pointed out that further investigation is necessary to discover satisfactory measures of control.

—F. Bullock.

Jones, F. S., & Little, R. B. (1933). **Proteins of the Whey Fraction in Milk from Normal and Abnormal Udders.**—*J. Dairy Sci.* **16.** 101-109. 2 tables, 3 graphs. [10 refs.]

Describes a method of estimating the proteins of whey volumetrically and demonstrates by precipitation tests the relationship between certain whey proteins and those of blood serum. It was found possible to correlate volume of protein precipitate with actual quantity of protein as determined colorimetrically. While normal milk contains a fairly uniform quantity of such proteins, they are increased in milk from mastitis udders and it would appear that the proteins found in milk during mastitis originated in the blood. The authors found differences existing in the albumin-globulin ratio between normal milk and that from abnormal udders.—R. G. Linton.

Albrecht, A. (1933). Ueber neuere Forschungsergebnisse und Beobachtungen auf dem Gebiete der Aufzuchtkrankheiten der Haustiere. [**Recent Results of Research and Observations on Diseases of Breeding Livestock**].—*Münch. tierärztl. Wschr.* **84.** 85-91, 97-104, 112-116, 121-126, 134-137, 171-174 and 185-188. [239 refs.]

This is a valuable systematic review covering, as judged from the extensive bibliographies, some five years up to the beginning of 1932. It is only possible in this abstract to indicate the ground covered ; the following conditions are reviewed :—sterility and abortion in cattle, sheep, goats and pigs, and diseases of calves, lambs, kids and piglets.

The review has been compiled from world-wide sources.—J. E.

Grimard-Richard, L. (1933). La momification du placenta. [**The Mummification of the Placenta**].—*C. R. Soc. Biol. Paris.* **112.** 631-633. [1 ref.]

A case of atrophy of the placenta in a guinea pig with consequent death and mummification of one of the foetuses is recorded. A histological examination of the placenta was made and from the alterations observed the author has endeavoured to arrive at an explanation and to reconstruct the series of events which lead up to the mummification.—N. S. Barron.

Inglis, T. M. (1932). **Some Notes on Grass Disease in Horses.**—*Vet. J.* **88.** 504-506.

The author, in practice in a grass disease area in Scotland, describes the various forms of the disease. His experience points to the aetiological importance of pasture grasses at the time of their rapid growth in spring and early summer.

In some cases a particular pasture field has been connected with an outbreak.

—J. E.

Maubaret, J. P. (1932). La jaunisse des muletons. Etiologie—Traitement. [**Jaundice in Young Mules**].—*Thesis for Docteur vétérinaire, Alfort.* pp. 41. [38 refs.]

The existence of a jaundice-haematuria syndrome in young mules aged from a few hours to three days has been recognized for many years in Poitou, where it still occasions considerable losses.

The aetiology of the condition was unknown until 1924 when Donatien and others showed that *Babesia equi* was the causal agent. The author demonstrated these parasites in the blood of 16 affected foals and also in the blood of a considerable but unstated percentage of their dams. This is accepted as proof that the infection is transmitted from dam to foal by the placental route. Infected mares show few or no clinical symptoms and, since ticks have never been found on any of them, the method by which they become infected remains conjectural. Nearly all of the many agents employed for the treatment of the condition proved ineffective. It is considered that the administration of quinine hydrobromide to mares nearing parturition has some prophylactic action, but that it is of no therapeutic value for affected foals. For the latter the combination of injections of a haemopoietic serum and the citrated blood of the mare gave promising results.

—A. A. Pryer.

Giovine, D. (1933). L'ematuria dei bovini da cistite cronica emorragica vegetante. [**Chronic Vegetative Cystitis in Cattle causing Haematuria**].—*Clin. Vet. Milan.* **56.** 169-179. 3 figs. on 2 plates.

The author describes a chronic vegetative cystitis which occurred in Colombia (S. America) on ranches situated over 1,000 metres above sea level. The condition appeared to be of more frequent occurrence when the altitude of the farms exceeded 2,600 metres and on virgin land recently deforested. The disease affected both imported and half-bred crosses indifferently, and both sexes over three years old. In cows it was perhaps rather more severe and the symptoms tended to become aggravated with advancing pregnancy. After parturition they showed some remission. The persistent haematuria lead to the production of marked anaemia. Histological examination of the lesions showed that essentially the condition was one of hyperplasia of the connective tissue of the mucous membrane of the bladder, infiltration with small cells and proliferation of the capillaries. In some cases actual polypi were formed.

Bacteriological and parasitological examinations failed to reveal any organism or worm which could be connected causally with the disease.

The distribution of the disease and the character of the land upon which it occurs suggests that the food supply is in some way to blame. [See other references to bovine chronic haematuria—this *Bulletin.* **1.** 95. and **3.** 318].

—A. Leslie Sheather.

Haddow, A., & Blake, Isobel. (1933). **Neoplasms in Fish : A Report of Six Cases with a Summary of the Literature.**—*J. Path. & Bact.* **36.** 41-46. 14 figs. on 4 plates, 1 table. [24 refs.]

The six cases are described and a summary of similar reports of 180 cases from the literature given. It was concluded that neoplastic diseases constituted a considerable fraction of the pathology of both fresh- and salt-water fish. Widespread metastases were very rare. The majority of the tumours were from derivatives of the mesoblast and only 10 per cent. were epiblastic ; the tumours occurred mostly in organs which have homologues in other vertebrates.

—J. R. M. Innes.

Schlegel, M. (1933). Zur Kenntnis der Geschwülste der Gallenblase bei Tieren. [**Communication on Tumours in the Gall-Bladder of Animals**].—*Berl. tierärztl. Wschr.* **49.** 147-148. 3 figs. [8 refs.]

The author gives a survey of the benign and malignant tumours in the bile-ducts followed by a detailed pathological, anatomical and histological description of three cases of cancer in the gall-bladder of three old fattened cows (adenocarcinoma nodosum polyposum cysticum and adenocarcinoma polyposum et infiltrativum). Considerable infiltration of the wall and a large dilatation of the gall-bladder were chiefly observed ; internally there were short- and long-stalked, occasionally ulcerated excrescences, knobby tumours, rough ridges and deep furrows in the mucous membrane of the gall-bladder. These tumours contained mucous and serous cysts. In all cases there were metastatic new growths in the liver tissue.

In one case the ductus cysticus was almost completely blocked by the tumours.

The author supposes that this form of tumour is caused even in old cows by irritation set up by *Fasciola hepatica* which is frequently present, especially as this form of tumour has not yet been found in other domestic animals.

—F. W. Müller (Berlin).

Hinteregger, F. (1932). Ueber die Beziehungen der Kurloff-Körper zu den einzelnen Leukozytenarten unter pathologischen Bedingungen. [**The Connection between Kurloff Bodies and the Type of Leucocytes under Pathological Conditions**].—*Folia haematol.* **46.** 256-267. 4 graphs. [29 refs.]

The author has carried out experiments with drugs for the production of Kurloff bodies with a view to obtaining a better insight into their origin and nature.

In the majority of experiments it was found that alterations in the blood picture, similar to those produced by adrenalin, occurred simply as the result, as it seemed, of drawing blood for examination. It therefore seemed that the bodies could be produced non-specifically, so to speak. However, it had to be remembered that an outpouring of adrenalin from the adrenal bodies might be causally connected with this phenomenon.

Both monocytes and granular lymphocytes may contain Kurloff bodies, but more frequently the latter.

The identity of Kurloff bodies with azur granules is not accepted, but the two are probably closely related.—A. Leslie Sheather.

Locatelli, P. (1932). Sui Corpi di Kurloff. [**Kurloff Bodies**].—*Folia haematol.* **47.** 220-229. 13 figs. [24 refs.]

The author reviews the opinions expressed by a number of writers regarding the nature of Kurloff bodies and, as a result of his own observations, the basis of which is not given in detail, he has formed the view that pregnancy and infection are both factors in their production. He finds that the presence of the bodies in he cells is associated with nuclear degeneration.—A. Leslie Sheather.

HENRY, A., LESBOUYRIES, G., & ROGER, H. (1932). Déséquilibre sympathique et dermatose chez le Chien. [**Sympathetic Disequilibrium in Relation to Dermatosis in the Dog**].—*Bull. Acad. vét. France.* **5.** 81-85. 2 figs.

ARLOING in 1891 drew attention to a curious lesion affecting the muzzles of dogs which had been subjected to experimental section of the cervical sympathetic cord. The authors, in the ordinary course of their clinical practice, have frequently observed lesions similar to those described by ARLOING. Detailed clinical descriptions are given of three cases.

The lesion is characterized by dryness and fissuring of the skin of the muzzle, accompanied by marked cell proliferation of the horny layer. In one case a double exophthalmos was present and in all cases there was modification of the oculo-cardiac reflex.

The authors infer that these conditions may be related to disequilibrium of the sympathetic nervous system. No local treatment proved of any value.

—J. RUSSELL GREIG.

BENNETTS, H. W. (1932). **Enzootic Ataxia of Lambs in Western Australia.**—*Austral. Vet. J.* **8.** 137-142 and 183-184. 8 figs. on 1 plate. [5 refs.]

The author reports investigations on enzootic ataxia of lambs in Australia, a condition which has been described as occurring in Peru, Sweden and the British Isles. It is described as a disease affecting young lambs from six weeks to four months old and characterized clinically by ataxia and pathologically by degeneration of nerve tissue. In fatal cases there is emaciation and paralysis.

It was found to be confined to certain small, well-defined areas, with one exception on cretaceous formations, and to remain strictly enzootic in lambs from ewes which had spent the gestation period in the areas. The incidence is 100 per cent. in ewes lambing for the third time in the area. Lambs born during the summer months rarely developed the disease ; it could also be avoided by removing the ewes to sound pasture for eight to ten weeks during the gestation period. Sex and breed appeared to have no significance. Death usually occurred from complications in three to four weeks ; lambs which developed symptoms at a later age survived, but continued to show ataxia.

Macroscopical *post-mortem* examination showed evidence of malnutrition. Sections of nerve tissue were examined from six recent cases and two older cases. In the recent cases Marchi preparations showed degeneration of nerve fibres in the dorsal and ventral cerebellar tracts, in the column of Goll in one case, and in the sciatic and femoral nerves. No changes were observed in Clarke's column. Sclerosis of the cord in the lumbar region was noted in the old-standing cases. No cell changes were noted in Mallory-stain preparations.

The author expresses the view that in early cases sensory nerves only are affected, but that motor nerves are affected as the disease progresses.

Bacteriological examinations were negative. A low haemoglobin content and a degree of polycythaemia were noticed.

In the absence of data upon the histology of the spinal cord in the sheep, the tracts and columns of the spinal cord are designated as in human histology.

—R. S. ROBERTS.

MALAN, A. I., DU TOIT, P. J., & GROENEWALD, J. W. (1932). **Studies in Mineral Metabolism.—XX. Iodine in the Nutrition of Sheep.**—*18th Rep. Direct. Vet. Serv. & Anim. Indust. Union of S. Africa.* Part II. pp. 651-676. 15 figs., 3 tables. [8 refs.]

0·02 g. of potassium iodide was given as a daily supplement to three groups

of Merino ewes at three levels of phosphorus intake—one very low, one equivalent to Bechuanaland pasture and one equivalent to good English pasture. Controls on the same rations, but without iodine supplement, were available for each group. No clear differences were noted until towards the second lambing 16 months after commencing the experiment, at which time very definite detrimental effects of the iodine on reproduction were observed. The number of pregnancies was apparently unaffected but only four lambs were produced as against 11 in the controls, and not one of them was alive on the third day afterwards. Eight ewes aborted or had the foetuses removed as against only one in the controls. The adverse effects of the iodide supplement were more pronounced in the group on lowest phosphorus intake.—H. H. Green.

Malan, A. I., & du Toit, P. J. (1932). **Studies in Mineral Metabolism XXI. A Comparison of Phosphatic Supplements for The Prevention of Aphosphorosis.**—*18th Rep. Direct. Vet. Serv. & Anim. Indust. Union of S. Africa.* Part II. pp. 677-702. 8 figs., 3 photographs, 5 tables. [9 refs.]

Precipitated calcium phosphate, bone meal, degelatinized bone flour, basic slag, superphosphate, ground Egyptian rock phosphate and sodium phosphate were compared as phosphorus supplement to cattle on phosphorus-deficient pasture [see this *Bulletin.* **2.** 168].

Rock phosphate was quite unsuitable and symptoms of fluorine poisoning appeared. The group receiving superphosphate improved as compared with the controls but the product was found to contain 1·5 per cent. of fluorine and symptoms of poisoning developed. Basic slag was very much inferior to calcium phosphate. Of the useful supplements the order of availability of phosphorus was :—(1) sodium phosphate, (2) precipitated calcium phosphate and (3) bone meal and degelatinized bone flour. Giving disodium phosphate in the drinking water was a satisfactory method of administration.—H. H. Green.

Bekker, J. G. (1932). **Studies in Mineral Metabolism XXIII : Phosphorus and Iodine Supplements in Field Experiments with Sheep. XXIV. "On the Administration of Phosphorus to Animals through their Water Supply."** —*18th Rep. Direct. Vet. Serv. & Anim. Indust. Union of S. Africa.* Part II. pp. 733-750 and 751-797. 8 figs., 1 plate, 19 tables. [34 refs.]

XXIII. Sheep grazed upon the phosphorus-deficient veld of Bechuanaland responded to a supplement of bone meal, showed much better development than the controls and were subject to lower mortality, especially from verminosis (3 deaths out of 39, as against 9 out of 24 for the controls).

Two groups also received a daily supplement of potassium iodide but the effect was adverse, and it is concluded that 0·075 g. of iodide is toxic when given over a long period—of the seven animals that became pregnant five aborted and the other two delivered weakling lambs which died shortly after birth.

The suitability of Bechuanaland veld for Merino sheep is discussed in relation to parasitic infestation.

XXIV. Discusses various methods for securing an adequate intake of phosphatic supplement by cattle under ranching conditions on phosphorus-deficient pastures and describes a tank and trough device by which phosphorus can conveniently be supplied in soluble form in the drinking water. Disodium phosphate was used with sufficient acid (sulphuric) to prevent precipitation by the hard water, and with a trace of copper sulphate to prevent growth of algae.

The method is essentially one for areas on which there is little open water and on which stock have to be watered from drinking centres (bore-holes, etc.)

on the farm. Under these conditions the method is economical in labour, involves minimum disturbance of grazing habits and provides phosphate in its most easily assimilated form. Experience showed that, under the conditions of Bechuanaland, natural consumption of water by different classes of stock at different seasons of the year was roughly proportional to phosphorus requirements, so that it was possible to adopt a standard concentration for the phosphated water.—H. H. GREEN.

DU TOIT, P. J., MALAN, A. I., GROENEWALD, J. W., & DE KOCK, G. v. d. W. (1932). **Studies in Mineral Metabolism XXVI. The Effect of Fluorine on Pregnant Heifers.**—*18th Rep. Direct. Serv. & Anim. Indust. Union of S. Africa.* Part II. pp. 805-807. 8 figs., 2 tables. [13 refs.]

In testing ground rock phosphate as a supplement for cattle on phosphorus-deficient pastures, toxic effects had been observed and attributed to the fluoride present. To control these observations two heifers were dosed daily with 5 g. each of sodium fluoride under laboratory conditions, two other heifers being maintained under similar conditions as controls. After a few months the fluoride heifers lost appetite and weight and showed other symptoms of poisoning. One died after abnormal calving in the eighth month of the experiment. The other was mercifully destroyed after about a year. Both showed characteristic swellings on the metacarpus and metatarsus. Lesions are illustrated by photographs of the long bones.—H. H. GREEN.

I. KRUSE, H. D., ORENT, Elsa R., & MCCOLLUM, E. V. (1932). **Studies on Magnesium Deficiency in Animals. 1. Symptomatology Resulting from Magnesium Deprivation.**—*J. Biol. Chem.* **96.** 519-539. 1 fig., 2 tables, 3 charts. [9 refs.]

II. PULLES, H. A. (1932). Een geval van verbloeding tengevolge van $CaCl_2$-necrose. [**A Case of Haemorrhage following Calcium Chloride Necrosis**].—*Tijdschr. Diergeneesk.* **59.** 1037-1038. [Summaries in English, French and German : abst. from orig.]

III. SJOLLEMA, B. (1932). Magnesium-gebrek als Oorzaak van excitatieverschijnselen en Tetanie. [**Magnesium Deficiency as Cause of Excitation Phenomena and Tetany**].—*Ibid.* 1052-1056. [Summaries in English, French and German : abst. from orig.]

I. A diet containing only 1·8 parts per million of magnesium, but otherwise suitable for rats, was prepared by special purification of starch, casein, and the yeast extract used as source of vitamins B and G. Magnesium-free butter was used as source of vitamins A and E, vitamin D was supplied as viosterol and the mineral mixture was made up from magnesium-free salts.

On this diet young rats (about 40 g. weight) passed through a spectacular series of symptoms, leading to an early and violent death. Within five days the exposed skin areas became vividly red from vasodilatation. This manifestation intensified until about the 12th day, then slowly subsided and was followed by pallor and slight cyanosis. During the hyperaemic period the animals showed extreme nervous irritability. The hyperexcitability increased from about the 11th to the 18th day, during which time any sudden disturbance was often sufficient to induce a convulsive seizure. By the 23rd day practically all the rats had experienced a first seizure. This was followed by a partial recovery phase and later seizures—usually several in rapid succession, constituting one convulsive attack. The majority of the rats died during the first attack, a few survived even a month before a second attack ensued, but eventually all animals died.

The behaviour varied somewhat with the age of the rats, but the main symptom

complex was much the same in all—hyperirritability of the nervous system, cardiac arythmia, spasticity and tonic-clonic spasms. This constitutes a " tetany " differentiated from other known types by the symptomatic feature of vasodilatation. Of special interest is the fact that anorexia and inanition were not characteristic of this " magnesium deficiency disease," but that growth continued at a fair rate right up to the point of convulsive seizures.

II. Describes a case of death from haemorrhage following necrosis, resulting from injection of calcium and magnesium chlorides into the lacteal vein in the treatment of grass tetany.

III. In this paper, Sjollema refers to the experiments described in I and compares the symptoms shown by the rats with those shown in grass tetany of cows. He considers that the hypomagnesaemia of grass tetany may be related to the hyperexcitability, but that some of the symptoms of tetany are related to disturbed calcium metabolism. He suggests supplementary administration of calcium and magnesium chlorides *per os* if the cows do not respond to a single injection [see this *Bulletin*. **3.** 202.] or to udder inflation.

[Note. In discussing grass tetany of cows (lactation tetany) the terms " magnesium deficiency " (which suggests a cause) and " hypomagnesaemia " (an effect or symptom) must be sharply distinguished. The first paper, above, describes a true magnesium deficiency disease in which hypomagnesaemia probably (no blood data given) occurs as a direct effect of the deficiency. But to produce this the authors had to use special purification methods to reduce the dietary magnesium almost to vanishing point—a mere fraction (less than one-thousandth) of the percentage present in the ordinary rations of cows. In the earlier experiments of Osborne and Mendel [(1918). *J. Biol. Chem.* **34.** 131.] young rats reached healthy maturity on a diet containing only 0·012 per cent. of magnesium. But the stall ration of cows suffering from lactation tetany is commonly over 20 times this figure, and the dry matter of young pastures on which grass tetany so frequently occurs may even show 50 times the suggested necessary minimum. Hence there can be no question of calling tetany of cows a " magnesium deficiency disease." There is, however, a marked hypomagnesaemia (even down to one-seventh of the normal blood magnesium) arising from some cause other than dietary deficiency (probably disturbance of a nervous and endocrine mechanism for regulating blood magnesium), and this probably accounts for the similarity of the main symptom complex of lactation tetany of cows and true magnesium deficiency in rats. It may also account for the response (usually good) to the inclusion of a magnesium salt in the therapeutic treatment of the disease—temporary rectification of the hypomagnesaemia perhaps giving the physiological mechanism time to regain control].—H. H. Green.

I. Aston, B. C. (1932). **" Bush Sickness " and "Dopiness" : Some Comparisons.**—*New Zealand J. Agric.* **44.** 107-110. [2 refs.]

II. Aston, B. C. (1932). **Iron Licks for Bush Sickness. Further Experiences with Sheep and Cattle.**—*Ibid.* 171-176. 2 figs., 2 tables. [5 refs.]

[The topic of these papers has been dealt with in several abstracts in this *Bulletin*—see Orr & Holm, **1.** 314 ; Aston, **2.** 390 ; Aston, **3.** 41 ; Malcolm, **3.** 41 ; Wright, **3.** 41 ; Askew, Rigg, Grange, & Taylor, **3.** 374 ; Becker, Neal, & Shealy, **3.** 374 ; Greig, Dryerre, Godden, Crichton, & Ogg, **3.** 429].

I. A general article on " bush sickness " in iron-deficient areas and " dopiness of sheep " occurring on lime-deficient soils.

II. Shows that " limonite," a naturally occurring hydrated oxide of iron, is a cheap and effective lick for preventing " bush sickness."—H. H. Green.

KUIPERS, K. R. (1933). Kopziekte (Grastetanie). [**Grass Tetany**].—*Tijdschr. Diergeneesk.* **60.** 1-6. [Summaries in English, French and German : abst. from orig.]

The author asserts that milk fever and grass tetany are due to an intoxication from the conversion of protein from a rich diet and excessive manuring of pastures and that the deficiency of mineral salts (Ca, Mg) is the effect and not the cause. Inflation of the udder combined with intravenous injection of calcium and magnesium chloride yields successful results in milk fever, but in grass tetany a relapse often occurs within 24 hours. Before giving the injection into the jugular vein with a syringe (capacity 200 c.c.) a cardiac tonic must be administered. Death in the prodromal stage is not rare. Prevention of both diseases is often possible by attention to diet and administration of purgatives.

—J. VAN DER HOEDEN (UTRECHT).

AUBEL, C. E., HUGHES, J. S., & LIENHARDT, H. F. (1932). **A Study of Mortality among Young Pigs. The Influence of Wheat-Germ Meal on the Reproduction and Suckling of Pigs.**—*Kansas Agric. Expt. Sta. Tech. Bull.* No. 31. pp. 22. 3 figs., 10 tables. [10 refs.]

Four experiments were carried out, involving altogether 35 sows and 330 pigs farrowed. The feeding of wheat-germ meal had no significant effect upon the number of pigs farrowed, or upon the number reared alive. The milking qualities, however, of the fed pigs were improved. It is shown that there is a relationship between the mortality of the suckling pigs and the ability of the sows to secrete milk. It was found that there was a progressive and marked fall in the blood haemoglobin from birth. This fall could be ameliorated, although not entirely prevented, by the administration of iron and copper. This was conveniently done by the application of a solution of soluble salts of iron and copper to the udder of the sow [see p. 735].—HENRY DRYERRE.

HARRIS, L. J., INNES, J. R. M., & GRIFFITH, A. S. (1932). **On the Pathogenesis of Avitaminosis A. Vitamin A as the Anti-Keratinising Factor.**—*Lancet.* **223.** 614-617. [21 refs.]

The experiments were carried out on rats. The animals were fed on a vitamin-A-free diet, to which was added just sufficient vitamin A to prevent too early death, but not sufficient to stimulate growth. Keratinization and infection progressed concurrently. The infection was restricted to the region of the xerosed tissues and seemed to be the result of the physical changes breaking down the defensive mechanism of the epithelium, thus allowing the entry of micro-organisms. These were generally non-pathogenic. There was no evidence that deficiency of vitamin A lowered the natural resistance of rats to tuberculosis. No justification was found for the belief that vitamin-A therapy is likely to be of value in combating acute general infections, or those toxaemias unassociated with the characteristic epithelial breakdown.—HENRY DRYERRE.

PUBLIC HEALTH.

—. (1932). **Report of Committee on Milk. Conference of State and Provincial Health Authorities. June 2, 1932.**—*Publ. Health Rep. Washington.* **47.** 1686-1689.

This report discusses various points connected with the production and distribution of clean milk. Amongst these it approves of " short time—high

temperature " pasteurization of milk on the basis of experiments carried out by New York State Health Department (evidence not given), but no specifications of temperature or time are stated.

It points out that improperly produced milk is not as safe as properly produced milk even if both are pasteurized before use.

The need for co-operation between the State Health and Agriculture Departments is stressed with a view to encouraging the farmer to comply willingly with the Public Health Sanitary requirements, for the sake of economical milk production and in order to breed confidence in the mind of the consumer as to the safety and value of milk as a food.—E. J. PULLINGER.

MAJOEWSKY, W. (1932). Het Melkbesluit en de Dierenarts. [**The Regulation regarding the Control of Milk and the Veterinarian**].—*Tijdschr. Diergeneesk.* **59.** 1107-1118. [Abst. from orig.]

The law for the control of milk in Holland refers to all milk destined either for consumption or for industrial purposes.

The supply of unsound milk is a punishable offence. However, there is no accurate description of the standards with which really good milk must comply ; an official division of the milk into classes, such as exists in America, had not been made in Holland.

In order to obtain milk that is free from bacteria and infection and that will remain sweet, attention must be given to :—(a) improvement of the milk production at the farms ; (b) control of the milk at the dairy, milk control station or on the premises of the retail-trader ; (c) the tracing of faults established by (b), and (d) control of the condition of the cattle.

The author gives a detailed description of the research done on tuberculosis and infection with streptococci.

The duty of the veterinarian is :—(1) to make an inspection of all cows for tuberculosis at least once a year ; at the same time he should make a clinical inspection of the udder and an inspection for the other notifiable diseases ; (2) to examine samples of mixed milk at least four times a year to trace milk emanating from cows affected with disease of the udder.—B. J. C. TE HENNEPE (ROTTERDAM).

MORHART, P. E. (1932). Les maladies microbiennes transmissibles par le lait. Travaux récents. [**Recent Work on the Bacterial Diseases Transmissible through Milk**].—*Rev. Path. comp.* **32.** 1440-1450. [32 refs.]

This is a review of the bacterial diseases transmissible to man by means of milk. The author merely summarizes the work of a large number of investigators on this subject and discusses the possibility of infection through the medium of cows' milk with the following organisms :—(1) lactic ferments ; (2) bacilli of the typhoid group ; (3) streptococci ; (4) poliomyelitis and foot and mouth disease and (5) tuberculosis. He also discusses prophylaxis.

Under lactic ferments he mentions the coliform group, *Bact. aerogenes*, *B. subtilis* and conditions such as blue milk, red milk, yellow milk, etc. He then discusses outbreaks of typhoid fever due to milk and the possibilities of a direct or an indirect infection.

Under streptococci he mentions *Str. lacticus*, *Str. agalactiae* (non-haemolytic), and the haemolytic *Str. pyogenes*, giving as examples various outbreaks of sore throat or scarlatina thought to have been produced by this type of organism. The Broadstairs outbreak of polyomyelitis is briefly discussed and the possibility of foot and mouth disease being communicable to man is considered.

Tuberculosis and the milk supply is reported on at some length and amongst

numerous authors mentioned he quotes largely from SAVAGE and from the Report of the People's League of Health on Bovine Tuberculosis.

The review concludes with a summary of measures to be taken to ensure a safe milk supply, chiefly from the point of view of tuberculosis infection.

—D. S. RABAGLIATI.

I. MCLEAN, A. (1932). **Bovine Tuberculosis and Milk.**—*J. State Med.* **40.** 597-602.

II. MATTHEWS, H. T. (1933). **A Preliminary Note on the Value of Microscopical Examination of Milk from more than One Cow for the Presence of Tuberculosis.**—*Vet. Rec.* **13.** 235-238. 3 tables.

I. This paper is on much the same lines as many others recommending the increased veterinary supervision of dairy cattle. The author points out the great benefits derived by growing children who are given a pint of milk in addition to their daily ration and he deplores the still high percentage of milks found to contain tubercle bacilli. The author is chiefly concerned with Northern Ireland and he cites the legislation concerning milk in force in that country.

A strong plea is made for whole-time veterinary officers for the routine inspection of milk cows as the only means whereby the Bovine Tuberculosis Order can be made really efficient. He considers that if veterinary inspection of cattle on these lines were made obligatory and a bacterial standard for all milk were laid down and adhered to, the risk of tuberculosis or other milk-borne diseases would be eliminated or so radically reduced that pasteurization would no longer be advocated. The legislation dealing with the inspection and sampling of milk also requires amendment.

II. With the knowledge of the importance of searching for cell groups in individual samples of milk from tuberculous quarters of the udder, and the aid given by these cell groups in making a rapid microscopic search for tubercle bacilli, the author has carried out investigations as to the significance of cell groups in control of bulk samples. He proceeds to define " bulk " and " control " samples, the former being taken as a routine measure by some sanitary authority, while the latter are taken in following up a positive bulk sample.

Samples of mixed milks are centrifuged for a short time and films made from the sediment in the usual way. These may be stained with methylene blue only, not necessarily by the Ziehl-Nielsen method, and examined under the low power for cell groups. Tests were made by mixing the milk from known tuberculous udders with milk from 2 to 22 cows and in dilutions of 1 : 10 to 1 : 100. In nine out of the ten samples examined cell groups were found, the negative sample being one in a dilution of 1 : 100.

Of six bulk samples of tuberculous milk, cell groups were found in two only, whereas out of 41 control samples examined microscopically, 34 were negative and so returned correctly, and seven were positive. Of the seven positive samples of tuberculous milk, two were returned negative in error and one which was doubly positive was only returned so as singly. Five of the seven were detected microscopically and the offending cows traced forthwith by further microscopic tests.

The occasional finding of cell groups of a non-tuberculous type is a complication for the recognition of which considerable experience is required. The finding of typical cell groups in control samples of milk appears to be sufficiently suspicious to warrant a careful examination being made of the milk of the individual cows comprising the group ; this may reveal a tuberculous udder. In the words of the author : " The object of reducing the period of inactivity inevitable with the biological test is a worthy one, and the labour involved, . . . small. With

trained microscopists it should be possible to trace the offending cow in as many days as it now takes weeks, and so prevent the continuance of infectivity of the milk supply which is often permitted." The author admits that the work is unfinished, but explains that it is published as circumstances have made it impossible for him to continue it in the near future.—D. S. Rabagliati.

I. Kuttner, A. G., & Zepp, H. D. (1932). **Paratyphoid-like Fever in Children Due to the Salmonella Suipestifer Group.**—*Bull. Johns Hopkins Hospital.* **51.** 373-387. 6 tables. [20 refs.]

II. —. (1933). **B. Suipestifer as a Cause of Disease in Man.**—*Lancet.* **224.** 151. [4 refs.]

I. The authors describe seven cases of infection with bacteria of the *suipestifer* group in children ranging from seven months to six years of age. The clinical picture varied, but in the main the symptoms were anorexia and fever. In none of the cases was diarrhoea a feature. The bacteria were isolated by blood culture in every instance and fell into two groups, six belonging to the monophasic European variety, whilst one was a diphasic type often referred to as the American type. It would appear as if the difference in geographical distribution is not very clear-cut as, although the diphasic type is commoner in America and the monophasic commoner in Western Europe, both types have been found in America and in Europe. The cases recorded were comparatively mild and of short duration, but there was no evidence of the source of infection, although the eating of infected pork is obviously suspected, even though none of the patients suffered from the usual gastro-enteritis associated with salmonella food poisoning.

II. The *Lancet* has published an annotation of *Bact. suipestifer* as a cause of disease in human beings, probably because of the recent contribution by Kuttner and Zepp. It is pointed out that there are several types all closely allied serologically, namely :—

(1) *Bact. suipestifer* (American type) associated with swine fever in America, only rarely pathogenic for human beings ; it fails to blacken lead acetate and does not ferment arabinose and only rarely dulcite.

(2) *Bact. suipestifer* (Western European type) associated with swine fever in this country and with food poisoning in human beings. It blackens lead acetate and also fails to ferment arabinose ; it rarely ferments dulcite. [The statement in the *Lancet* that this type ferments arabinose is incorrect].

(3) *Bact. paratyphosum* C, found chiefly in the East and of human origin only.

[The Glässer-Voldagsen types described in Germany and, as far as we know, solely of porcine origin, are not included in this review].—R. Lovell.

Fooy, J. P. (1932). Heeft de waterstofionen-concentratie invloed op het kiemgehalte van vleesch ? [**Has the pH an Influence upon the Growth of Bacteria in Meat ?**]—*Tijdschr. Diergeneesk.* **59.** 719-726. 6 tables. [Summaries in English, French and German : abst. from orig.]

The author carried out the experiment described in order to ascertain whether bacteria of the meat-poisoning group grow less easily in meat with a pH of about 6·9 than in meat with a pH of about 5·8. He therefore carried out tests *in vitro* and *in vivo*.

In *in vitro* tests a perceptible delay in the growth was not seen until the pH had become less than 5. From the flesh of a goat, injected intravenously with a culture of *Bact. suipestifer* ten minutes before slaughter, the bacilli could still be cultured after 72 hours at a pH of 5·75.

As the result of these tests the author considers that there is no evidence that

the pH of normal meat inhibits bacterial infection capable of causing meat poisoning. —B. J. C. te Hennepe (Rotterdam).

van der Kamp, C. J. G. (1932). De Beoordeeling van het vleesch van varkens met urticaria en endocarditis verrucosa. [**Inspection of the Meat from Pigs affected with Urticaria and Endocarditis Verrucosa**].—*Tijdschr. Diergeneesk.* **59.** 820-825. [Summaries in English, French and German : abst. from orig.]

According to von Ostertag it is unnecessary to make a bacteriological examination of meat from pigs suffering from endocarditis verrucosa or urticaria, as, when *Erysipelothrix rhusiopathiae* is encountered it is only present in very small numbers. Contrary to von Ostertag's opinion, the author's personal experience is that in these cases the organism is present in large numbers. Bacteriological examination of meat from pigs with symptoms of swine erysipelas is, therefore, necessary. If a positive result is obtained, the organisms should be killed by heat sterilization or some other process.—B. J. C. te Hennepe (Rotterdam).

van Manen, A. (1932). Iets over het bacteriologisch onderzoek in de Vleeschkeuring naar Aanleiding van een Geval. [**Importance of Bacteriological Examination in Case of Local Infections**].—*Tijdschr. Diergeneesk.* **59.** 1050-1052. [Summaries in English, French and German : abst. from orig.]

When carrying out a bacterological examination on a pig, *Bact. suipestifer* was cultivated from the spleen, while the kidneys were sterile and cultures made from meat also remained sterile. In connection with this examination and others made at the Amsterdam slaughterhouse, the author insists that such examinations should be as thorough as possible.

Finally the author points out the importance of bacteriological examination in case of local infections.—B. J. C. te Hennepe (Rotterdam).

I. Lehnert, E. (1932). Kampen mot råttan. [**Combat against Rats**].—*Skand. Vet.-tidskr.* **22.** 62-63.

II. Hülphers, G. (1932). Något om råttutrotning och några försök med råttutrotningsmedlet Ratopax. [**On Rat Extermination and Some Tests with " Ratopax "**].—*Ibid.* 563-569. [4 refs.] [Summary in English : abst. from orig.]

I. Lehnert advocates the compulsory and universal appointment of a rat week in Sweden in November of every year. He refers to the most successful rat poisons, which are sold in Sweden under the names of " ratin " [*Bact. enteritidis* Gärtner (ratin strain) lethal for rats, but stated to be harmless to man and domestic animals] and " ratinin " (red squill). Both are very effective. Reference is made to successful rat extermination achieved on 140 farms during recent years.

II. Hülphers reviews the methods of rat destruction which include mechanical, biological and toxicological means. Biological rat-killing agents prepared from the ratin strain are made separately in Sweden (ratin), France (Danysz virus), Holland (virus made in Rotterdam) and England (Liverpool virus). Isolated cases have shown that these preparations can cause disease in young children and animals.

Poisonous preparations for rats have in the past been numerous, consisting chiefly of metallic salts, alkaloids, etc., which are also toxic for man and animals : their indiscriminate use is, therefore, dangerous. Red squill is a very good rat poison ; it has, however, been known to cause illness in human beings, though under exceptional conditions only.

Various poisonous gases have been employed to clear out rat burrows : they are useful in certain locally suitable cases.

" Ratopax," introduced at the Congress for Rat Control of Paris, 1932, is said to contain red squill and a digitalis glucoside.

The author tested its action on 12 brown rats, 8 guinea pigs, one rabbit, one pig and 4 fowls : the rats took it (soaked into bread) readily and all died within two days ; one of eight guinea pigs died, but none of the other test animals suffered ill effects. All except the rats and fowls had to be forcibly fed.—J. E.

THERAPEUTICS.

I. —. (1933). **Developments in the Treatment of Animal and Human Trypanosomiasis and in Tsetse Fly Control in the Period 1925-31.**—*Econ. Advisory Council Tsetse Fly Committee Report.* London : H.M. Stat. Office. [6d.]

II. —. (1933). **Report of the Tsetse-Fly Committee of the Economic Advisory Council. Developments in the Treatment of Animal and Human Trypanosomiasis and in Tsetse-Fly Control in the Period 1925-31.**—*Vet. Rec.* **13.** 171-172.

I. A Tsetse Fly Committee was set up in 1925 as a sub-committee of the Committee of Civil Research and since 1927 has acted as a standing advisory committee with the following terms of reference :—to consider and report on questions relating to human and animal trypanosomiasis in British Colonies and Dependencies in Africa. The committee consists of 13 members of whom Dr. Andrews is the only representative of the veterinary profession. The report is intended to give a brief survey of developments during the period 1925-1931.

The section of the report which deals with the developments in the treatment of animal trypanosomiasis emphasizes the better understanding of the complexity of the problems that has been obtained and the fuller knowledge of latent or dormant infections which may exist without anaemia or other symptoms. In Northern Nigeria it has been estimated that from 20 to 30 per cent. of cattle show this dormant infection. Such infections amount to premunition which, however, may break down on exposure to adverse conditions and Hornby emphasizes the fact that premunition may only involve resistance to local strains and may break down when a new strain invades the district.

The significance of the various species of trypanosomes, the problems of diagnosis and the value of the various serological tests are discussed. It is concluded that there is ground for hope that sufficiently accurate but simpler serological diagnostic tests will yet be evolved, but that in the meantime reliance has still to be placed on microscopic examination, in spite of its limitations. In treatment, antimosan offers some advance on antimony tartrate as it can be injected subcutaneously and is less toxic, but its cost is a serious disadvantage. Methods of control, the use of prophylactic drugs and the possibility of establishing effective premunity are discussed, but no definite advance is recorded.

The section devoted to human trypanosomiasis records results from treatment with germanin (Bayer 205), tryparsamide and a combination of the two ; the use of Bayer 205 and Fourneau 309 as preventatives is discussed. The section dealing with the development of measures for the control of tsetse flies discusses the reclamation of areas by settlement, grass fires and strip clearings, and the prevention of reinfestation by game barriers and fly barriers, such as thickets and plantations. The eradication of tsetse by hand-catching and flytraps is discussed and the possible value of releasing male flies in order to disturb the ratio of the sexes

which would favour abortions. Considerable areas in Tanganyika Territory and in Nigeria appear to have been made available for stock by clearing or controlled grass firing.

II. The second paper is a review of the first. It is suggested that local residents fully appreciated the nature and complexity of the problems prior to the period of the report and it is doubtful whether there has been any appreciable progress. It is pointed out that antimony tartrates were first used in Africa in 1909 and that there has been no appreciable advance in a knowledge of their action or in the method of application. It is considered that strip clearings, settlement and the use of traps do not offer a final solution of the tsetse problem and that SWYNNERTON'S theory of the use of properly organized grass burning has very definite limitations. It is suggested that it should be found possible to overcome the failure of premunition against different strains of a trypanosome. The report states that the committee met at frequent intervals to hear the evidence of officers engaged in the work but, it is pointed out, no list of the witnesses is given.

—U. F. RICHARDSON.

I. BROWN, H. W. (1932). **The Treatment of Ascariasis and Trichuriasis with Hexylresorcinol Pills.**—*Amer. J. Hyg.* **16.** 606-608. 3 tables, 5 graphs. [2 refs.]

II. CLAPHAM, Phyllis A. (1932). **Hexylresorcinol as a General Vermicide.**—*J. Helminthol.* **10.** 195-208. 5 tables. [16 refs.]

I. Hexylresorcinol is unsuitable for administration in gelatine capsules because of its reaction with the gelatine ; the drug was therefore prepared in the form of sugar-coated pills containing 0·2 g. and an account is here given of the results obtained on ascaris and trichuris in a number of cases. The dose of 1·0 g. was given in the early morning, no food being allowed for four to five hours afterwards, and the results obtained showed an average anthelmintic efficiency of 90 per cent. for ascaris and of 32 per cent. for trichuris. It was again noticed that the presence of food in the alimentary canal greatly reduced its effect. [This drug is still rather expensive for general use in veterinary medicine, but it is not unlikely that its price will fall along with a demand for its manufacture in larger quantities].

II. This paper gives a record of experiments carried out *in vitro* and *in vivo* on the toxicity of hexylresorcinol for eelworms, flukes, roundworms, tapeworms and the eggs of worms, further demonstrating the very marked potency of this new anthelmintic. A stock solution of 1 : 1,000 *n*-hexylresorcinol in 0·1 per cent. methyl alcohol was used for the *in vitro* experiments and it was found that hexylresorcinol in dilution of 1 : 20,000 killed free-living nematodes (*Rhabditis*, *Diplogaster* and *Dorylaimus*) in 27 to 80 minutes.

Infective larvae of the parasitic nematodes *Ancylostoma* and *Strongyloides* were killed by the drug in this dilution in 5 hours and 5 hours 30 minutes respectively. *Heterodera schachtii* and *H. radicicola* (nematodes parasitic on plants) were more resistant and survived in this dilution for 16 days and 3 days respectively. The miracidia of the blood fluke *Schistosoma haematobium* and the liver fluke *Fasciola hepatica* were killed in the course of a few minutes in this high dilution and a dilution of 1 : 1,000 quickly killed the eggs. *In vivo* experiments were carried out on mice infected with *Hymenolepis murina* and *Aspicularis* sp. Doses of 0·04 and 0·05 g. were too high and killed the mice, but lower doses removed many and, in some instances, all of the cestodes and nematodes without proving toxic for the mice. Notes are also given on the pathological changes which were observed in the mice.—E. L. TAYLOR.

I. Kauzal, G. (1932). **The Use of Carbon Tetrachloride in the Treatment of Kidney Worm Infestation in the Pig.**—*Austral. Vet. J.* **8.** 68-69. [1 ref.]

II. Rawson, G. W. (1932). **A Comparison of Carbon Tetrachloride and Tetrachlorethylene.**—*J. Amer. Vet. Med. Ass.* **80.** 600-603. [7 refs.]

I. Of three pigs experimentally infected with *Stephanurus dentatus* by skin penetration, two were treated with three doses of carbon tetrachloride and one kept as a control. It was found at autopsy that, although worms had reached the perirenal tissue in the control, they had not done so in the other two pigs, encysted worms being found in the liver of one and none in the other. As *S. dentatus* spends a period of four or five months in the liver before migrating to the kidney, it is thought that judicious dosing with carbon tetrachloride may prove of some service in its control.

II. Extracts from the literature are given to disprove some erroneous, popular ideas concerning the dangers attending the use of tetrachlorethylene as an anthelmintic.—E. L. Taylor.

Knilans, A. J. (1933). **An Easy Method of Supplying Iron and Copper to Baby Pigs.**—*J. Amer. Vet. Med. Ass.* **82.** 778-780. 2 figs.

An illustrated description of a simple yet ingenious method of painting the udders of breeding sows with a solution of iron citrate and copper sulphate, which is licked off by the suckling piglets. The essential part of the apparatus is a felt-covered roller suspended in a trough containing the mineral salts solution : the sow has to pass over the roller in the doorway of the sty to get her feeds of swill and on return to the litter has obtained a good coating of the mixture. This method is said to be valuable in preventing anaemia and similar diseases in the young pigs.—J. E.

I. Graf, H., & Wilken-Jorden, T. J. (1932). **A.—Lime-Sulphur Dips. Paper I : General Introduction. Lime-Sulphur Dips.**—*18th Rep. Direct. Vet. Serv. & Anim. Indust. Union of S. Africa.* Part II. pp. 1005-1014. 1 table, 1 map. [9 refs.]

II. Wilken-Jorden, T. J. (1932). **Researches into Dips and Dipping. A.—Lime-Sulphur Dips. Paper II. A New Laboratory Method of Chemical Analysis.**—*Ibid.* pp. 1015-1027. 1 fig., 4 tables. [26 refs.]

III. Wilken-Jorden, T. J. (1932). **Researches into Dips and Dipping. A.—Lime-Sulphur Dips. Paper III. A Preliminary Study of a Colorimetric Method as a rapid means of control of Polysulphide Solutions.**—*Ibid.* pp. 1029-1035. 5 tables. [3 refs.]

I. A general introduction on dipping in South Africa, followed by a discussion on the past and present use of lime-sulphur for eradication of sheep scab [scabies] and an indication of lines of future investigation.

II. A review of literature on the analysis of sulphides and polysulphides followed by a description of a new volumetric method in which " monosulphide equivalent " is determined by iodometric titration after precipitation as cadmium sulphide. Free polysulphide is titrated as thiosulphate after conversion with sodium sulphite. Total sulphur is determined gravimetrically in the usual way.

III. Discusses the control of lime-sulphur dips under field conditions and favours a rapid colorimetric method for ascertaining the approximate strength of tank fluid. A solution of pure chromic acid in water was found to be a suitable permanent standard for comparison with calcium polysulphide solutions, and sufficiently good results were obtained except under certain conditions not yet fully elucidated.—H. H. Green.

Frei, W., & Bisig, J. (1932). Ueber eine Pflanzensubstanz mit follikulinähnlicher Wirkung. **[On a Plant-Extract with Folliculin-Like Action].**—*Schweiz. Arch. Tierhlk.* **74.** 569-573. 3 figs.

This is a preliminary report on experiments carried out to ascertain the action of a plant-extract manufactured by A. Lüthy-Meier, Basel. The name of the plant from which the extract was derived is not given. The active principle proved to be insoluble in water but soluble in oil as well as in lipoid-dissolving liquids. The repeated injection into a bitch of a solution of the active principle in olive oil was followed by vaginal discharge, indicating an action on the uterine glands. Further tests on rabbits revealed a marked increase in size of the uterus due to proliferation of the endometrium and especially of the glands. Besides these changes in the histological structure there was a marked stimulating effect on the myometrium, indicated by a raised tonus and increased contractions.

—R. Wetzel (Hanover).

POISONS AND POISONING.

Oliver, T. (1932). **Emanations from Coke Ovens : their Harmful Effects upon the Workmen, also upon Animals Grazing upon adjoining Pasture Land.**—*Arch. Gewerbepath. u. Gewerbehyg.* **3.** 295-299. [Orig. in English].

In regard to stock, a possible source of danger is indicated in the discharge from coke ovens of emanations containing small proportions of lead, copper and manganese. In a case of alleged poisoning of sheep and bullocks in Durham, the herbage was reported by the analysts to contain in two instances 45 parts of lead and 7 of copper and 14·1 of lead and 4·7 of copper per million respectively, these metals being also detected in the viscera of sheep and bullocks. A sheep showed in stomach tissue 0·6, in contents 0·2, in kidney 1·7 and in liver 2·6 parts per million of lead.

Four specimens of urine from six men who had been oven workers for upwards of 20 years showed lead in proportions varying from 0·49 to 1·47 parts per million.

—G. D. Lander.

Hinz, W. (1933). Ueber die Möglichkeit der Einschränkung der Giftwirkung oral applizierter Wurmmittel auf den Wirtsorganismus mit besonderer Berücksichtigung des Chenopodiumöles. **[On the Reduction of the Toxic Effects of Anthelmintics administered *per os* with Special Reference to Oil of Chenopodium].**—*Tierärztl. Rdsch.* **39.** 38-40. [21 refs.]

Hinz succeeded in reducing the toxic effects of oil of chenopodium by adsorbing it on to medicinal charcoal. The tests were made on dogs. The administration of charcoal containing 3, 4, 6, 8 and 10 drops of the oil respectively per kg. body weight proved to be innocuous, whereas a dose as low as 2 drops of the oil per kg. body weight without charcoal produced severe symptoms of poisoning in the controls.

In vitro tests carried out at room temperature by Graf and Müller showed that the oil of chenopodium adsorbed by charcoal had no effect on segments of a leech. The successful treatment of dogs harbouring ascarids, however, demonstrated that the anthelmintic efficiency was still present. The author explains these results by the different coefficients of expansion of the oil and the charcoal respectively, which cause small amounts of the oil to be released at body temperature. He concluded that the same effect may be obtained by using other adsorbants, the

coefficient of expansion of which is different from that of oil. A test with silicious infusorial earth confirmed this theory.

The method suggested also appears to be applicable to other liquid anthelmintics. Some tests with male fern adsorbed on to charcoal gave encouraging results.

Details of the experiments will be published later in a thesis by WESSEL.

—R. WETZEL (HANOVER).

MANLEY, F. H. (1932). **The Toxicity of Sorghum halepense (Johnson Grass) for Sheep.**—*Vet. J.* **88.** 260-262. [5 refs.]

The author reviews the literature on poisoning of livestock with sorghum grasses and reports the results of feeding experiments on sheep in Cyprus, where Johnson grass is common. The results were as follows :—

(1) The seeding plant, fed *ad lib.* to three sheep after fasting, caused no illness;

(2) The dried young plant, similarly offered after fasting to two sheep, was eaten by them to the extent of about half a pound each : one showed acute general collapse within an hour and died in three hours. The other showed less intense symptoms and recovered after several hours. The dead sheep showed congestion of the lungs, spleen and kidneys, a fatty liver and intensely red blood. There was a smell of prussic acid in the chest cavity ;

(3) The dried young plant fed without previous fasting : one sheep took about 2 oz. and showed muscular tremors and recurring inability to stand and died in 45 minutes ;

(4) The fresh young green plant : two ewes were forcibly fed with about 1 oz. each, but showed no illness ;

(5) The fresh green plant just beginning to seed caused no illness when fed to three ewes in doses up to 6 oz.

(6) Grass as in (5) dried for 48 hours caused no illness when 2 oz. were fed to one ewe.

The experiments support the view that the plant is only toxic in the dried young state.—J. E.

ENGE, E. H. (1933). **Flax Straw Poisoning in the Horse.**—*Vet. Med.* **28.** 161.

Nine cases of damage to horses recently observed by the author were ascribed to the use of mouldy flax straw as forage. The animals showed slow and weak pulse, polyuria, incoordination of movements with staggering gait and weakness of the hind quarters, and constipation.

The condition yielded to removal of the cause, purgative treatment and a laxative diet.—G. D. LANDER.

STEYN, D. G., & DE KOCK, G. (1932). **Crotalariosis in Sheep.**—*18th Rep. Direct. Vet. Serv. & Anim. Indust. Union of S. Africa.* Part II. pp. 947-953. 1 table, 2 charts. [4 refs.]

Six sheep were dosed, by drenching with the dry *Crotalaria dura*, with daily doses ranging from 100 to 400 g. and the detailed observations are tabulated. The period of latency varied from one day with 400 g. to 7 days with 100 g., and the duration of the disease similarly from 9 to 128 days. The symptoms of fever—an accelerated but strong pulse and increased respiration—resembled those described by THEILER as occurring in horses. The main lesions were those of a desquamative productive pneumonia, whilst in the liver the main lesions were of the nature of a venous hyperaemia, with fatty changes in the majority of cases and slight cirrhosis in a few.—G. D. LANDER.

HANTSCHE. (1933). Meerzwiebelvergiftung zweier Schweine. **[Squill Poisoning in Two Pigs].**—*Berl. tierärztl. Wschr.* **49.** 165-166.

A case record of illness in two pigs which were believed, on strong circumstantial evidence, to have eaten some squill preparation laid down round farm buildings to poison rats.

The pigs showed a slight fever, livid skin discolourations with a cold skin surface, anorexia and ventral recumbency. On slaughter there was found acute inflammation of the gastro-intestinal tract and kidneys. On macroscopical examination the central veins of the liver lobules showed up prominently.

The author tabulates the differential diagnosis of squill poisoning and swine erysipelas.—J. E.

PHYSIOLOGY.

ZELENY, C. (1933). **Genetics and Embryology.**—*Science.* **77.** 177-181. [Address of the Vice-President and Chairman of Section F—Zoological Sciences, American Association for the Advancement of Science, presented at the Zoologists' dinner at Atlantic City, Dec. 19th. 1932].

In evolution, periods of isolation alternating with periods of intermingling among groups are necessary for progress and this also holds good in the case of a special science. Early investigators in genetics formed an isolated group and confined their attention to the sorting of the genes, until this science seemed destined to stagnation. Genetics was rescued from stagnation by cytology, these two separate fields of biological enquiry fitting naturally into a common system. For example, the law of segregation of genes fits naturally into the cytological observation of the separation of the chromosomes of a pair during mutation. Genetics, having incorporated cytology, entered upon a fresh sorting and rearrangement of genes and groups of genes. This has now reached sufficient maturity to warrant incursions into embryology and physiology, since the gap between the genes as postulated units of heredity and their expression in the adult can be bridged only by observations of embryological events. Examples are given in the development of serpulid worms and the bar-eye series of allelomorphs in *Drosophila* to suggest the intimate functional relations of genetics with embryology.

—J. A. NICHOLSON.

MORRIS, N. (1933). **A Review of Observations on Diet in Relation to Health and Disease.**—*Nutrition Abst. & Rev.* **2.** 665-680.

This article comprises a comprehensive résumé of the abstracts relevant to the subject, which appeared in Volume I of *Nutrition Abstracts and Reviews.* The subject is dealt with under four heads which show broadly the relationship of diet to growth, to production of disease, as a therapeutic measure and in the production of immunity. The anaemias and goitres are dealt with fully and references are made to the merits and demerits of vegetarian diets. A section discusses the published results bearing on diseases of domestic animals due to dietetic deficiencies. The paper deals with the results of 285 investigations and should be consulted in the original, as naturally it does not lend itself to abstraction.

—HENRY DRYERRE.

RICHARDSON, A. (1933). Die Erfassung der verhältnismässigen Preiswürdigkeit der marktgängigen Futtermittel. **[Determination of the Comparative Values of Commercial Feeding Stuffs].**—*Biedermanns Zlb. Agrik.-chemie B. Tierernährung.* **5.** 191-212.

The author discusses the usefulness of current methods of evaluating feeding

stuffs on a money basis, adversely criticizes the method of MEINHOLD and compares that of ADOLPHI with his own. [For a common English method, based on " starch equivalent," see chapter " Purchasing Feeding Stuffs " in T. B. WOOD's " Animal Nutrition." (1931). London : University Tutorial Press].

The suggested method abandons the " starch equivalent " or " net energy " [for terms see FORBES, this *Bulletin*. **3.** 214.] as basis of comparison and evaluates protein and non-protein components separately. The starch value of the digestible protein of the food [roughly the percentage of digestible protein—factor 0·94] is deducted from the total starch value and taken as primary basis of comparison. The " unit of exchange value " (denoted T.W.E. = Tauschwerteinheit) in the metric system is then " 1 kg. starch equivalent beyond the digestible protein." The protein is evaluated separately by multiplying the percentage of digestible protein in the foodstuff by an appropriate factor ascertained by scanning current market prices for protein-rich and protein-poor foods. The calculated value of the feeding stuff is the sum of these two figures, expressed in " T.W.E." or as a price.

A survey of composition of feeding stuffs in relation to market prices shows that a distinction must at once be made between animal and vegetable protein, the former costing about twice as much as the latter quite regardless of real physiological values. Foods of vegetable and animal origin therefore fall into separate classes and, if desired, a separate factor may be used for each.

The " unit of exchange value " (T.W.E.) is not intended to be a new physiological expression but merely a convenient means of referring oscillating market prices to the two components which govern practical choice of feeding stuffs in compounding rations for particular purposes.—H. H. GREEN.

SWETT, W. W., MILLER, F. W., & GRAVES, R. R. (1932). **Quantity of Milk obtained from Amputated Cow Udders. Composition of Milk obtained from Amputated Cow Udders.**—*J. Agric. Res.* **45.** 385-400 and 401-419. 2 figs., 11 tables. [17 refs.]

In order to prove whether milk is stored in the cow's udder or largely secreted during the process of milking, the authors carried out some experiments with the amputated udders of cows. In the paper they first discuss in some detail the work of other investigators in the subject and then describe their own experiments.

Two series are reported, the one including four cows and the other seven. The milk yield of all the cows was carefully recorded before slaughter and the actual slaughtering was carried out just before milking was due. There were two *post-mortem* milkings carried out at approximately four hours' intervals, the first being done as soon as possible after death. In the first series of four cows the udders were kept at ordinary temperatures and allowed to cool, whereas in the second series the udders were kept in a specially prepared box which was heated and retained at blood heat.

It was found that the percentage of milk obtained at the *post-mortem* milkings was considerably less than that at the *ante-mortem* milkings. This difference was the more marked when death had been accompanied by undue struggling and when the amputated udders were allowed to become chilled than in the case of the cows killed by shooting and when the udders were afterwards kept at blood heat. Approximately 80 per cent. of the milk obtained at the *post-mortem* milkings was drawn at the first milking and 20 per cent. at the second.

In the first series, in which the cows were felled by a blow and the udders allowed to chill, 61·10 per cent. of the *ante-mortem* milk yield was obtained ; in the second series, in which the cows were killed by shooting and their udders

kept at approximately blood temperature, 75·32 per cent. of that obtained before death was recovered. The two groups taken together yielded 70·15 per cent. of the *ante-mortem* quantity. It would thus appear that milk secretion is a continuous process and the milk is already stored in the udder when milking commences.

The authors carried out tests on the composition of the milk from the amputated udders of the same two series of four and seven cows described above. Tests were made as to the total solids, the butter-fat, solids-not-fat, ash, total protein, the protein-fat ratios and the lactose. These results were compared with the carefully recorded *ante-mortem* analyses, both from the first and the second *post-mortem* milkings.

It was found that the butter-fat was only about half as high on the *post-mortem* milking as normally and in the case of the cows whose udders were not kept at blood heat it showed a marked drop on the second *post-mortem* milking. This was probably due to the chilling of the udders, for in the case of udders kept warm the second *post-mortem* milking gave a higher percentage of fat than was obtained at the first. Flushing out the secretory system of the amputated udders with a solvent, increased to some extent the total quantity of butter-fat obtained, but not more than 44 per cent. of the fluid injected could be obtained again. The total solids were lower in the *post-mortem* milk than in life and so also were the solids-not-fat, but not to nearly such an extent, for the fat which was much less in quantity was included in the former. The percentage of ash was higher in the first *post-mortem* milk than during life and decidedly higher in the second *post-mortem* milk than in the first. The total protein was almost the same in the first *post-mortem* milk as in life, but lower in the second. The fat-protein ratio was very similar to that of the butter-fat. The lactose was slightly higher in the first *post-mortem* milk than during life, but lower in the second when the udders became chilled ; when kept warm after amputation the result was much the same, except that the lactose in the first *post-mortem* milk was slightly below instead of above the *ante-mortem* milk. Generally speaking, the results showed that the most outstanding difference between the milk from the living cow and that obtained after death was in the butter-fat.—D. S. Rabagliati.

Blackwood, Janet H., & Stirling, J. D. (1932). **The Absorption of Milk Precursors by the Mammary Gland. V. Physico-Chemical Aspects of Milk Secretion.**—*Biochem. J.* **26.** 1127-1137. 4 tables. [21 refs.]

A theoretical treatment, based upon a few analyses made at random of cows' milk and blood and of certain physico-chemical aspects of milk secretion. The results of this consideration are not incompatible with the view that the nature of the transudation from the blood stream to the mammary gland may be explained best by the hypothesis of selective absorption of milk precursors at the membranes separating the cells from the blood supply. It is considered that during milk secretion a transudate is separated from the blood having the same osmotic pressure as blood, and that during synthesis (of the lactose and milk proteins) water is returned to the blood to maintain the tonicity of the cell fluid.—W. R. Wooldridge.

Campbell, J. A., & Hill, L. (1932). **Rate of Saturation of Goat's Tissues with Excessg Gaseous Nitrogen during Exposure in vivo to increased Atmospheric pressure.**—*J. Physiol.* **75.** 22 P. 1 fig. [1 ref.]

When goats are exposed to + 3 atmospheres pressure of air the bone marrow takes up nitrogen. The marrow becomes about 25 per cent. saturated in one hour, 60 per cent. saturated in four hours and 90 per cent. saturated in eight hours.

—W. R. Wooldridge.

MARRIAN, G. F. (1933). **Recent Advances in the Chemistry and Biological Assay of Oestrin.**—*Physiol. Rev.* **13.** 185-221. 3 tables. [73 refs.]

The recognition of the ovary as an organ of internal secretion was naturally followed by numerous attempts to obtain extracts from ovarian tissue that would be effective in inducing characteristic oestrus changes in the accessory sex organs. It was not, however, until the introduction of the vaginal smear technique that quantitative tests for oestrus-producing extracts became available. A further bar to progress lay in the fact that a readily available source of the hormone was lacking, until the discovery that a cheap and easily obtainable supply was to be had from the urine of pregnant women and mares, and that the hormone could be extracted by ether or chloroform.

A discussion on the nomenclature is given, and the author suggests that the substance should retain the name oestrin, in spite of the isolation of another closely related compound from the urine. It is suggested that this latter substance should be called oestrin-hydrate.

The review contains a detailed account of the purification and crystallization of these compounds and a scheme is drawn up for their isolation. The reader is advised to consult the original article for further details, since the subject matter does not lend itself to abstraction.

The biological assay of oestrin is determined by vaginal smears from rats and mice—one rat unit equals approximately ten mouse units. The method proposed consists in injecting each of a series of groups of at least 20 animals with different amounts of a standard preparation of oestrin. The percentage of each group showing a positive response is then plotted against the amount of oestrin administered. The amount corresponding to a 50 per cent. response is defined as the unit. To assay the potency of any extract, the same amount is injected into each of 20 mice and, after determining the percentage positive response, the number of units or fraction of a unit received by each animal is calculated by reference to the previously constructed curve. By such a method oestrin can be assayed with an error of not more than ± 10 per cent., whereas with other methods of assay an error as great as 1,000 per cent. may arise.—J. A. NICHOLSON.

COURRIER, R., & KEHL, R. (1933). Sur l'avortement folliculinique chez la Lapine. [**Folliculin and Abortion in the Rabbit**].—*C. R. Soc. Biol. Paris.* **112.** 675-677. [4 refs.]

Folliculin, an extract of liquor folliculae, has been shown by numerous workers to be capable of causing abortion when injected into pregnant animals such as the rabbit, the guinea pig and the mouse.

The authors, using two separate preparations, injected them into rabbits at different periods of pregnancy varying from the 5th to the 17th day. Gestation was not interfered with when the folliculin was administered between the 5th and 6th days or between the 7th and 8th days, but abortion was produced by a similar dose when given between the 12th and 17th days.

Contrary to general experience, an increasingly smaller dose was required to produce the same phenomena as pregnancy advanced and it is suggested that this indicates a reduction in the activity of the lutein after the 12th day.

Herein also lies a possible method of measuring the degree of activity of the latter.—N. S. BARRON.

DEMMEL, M. (1932). Die Refraktion des Blutserums im Sexualzyklus des Rindes. [**The Effect of the Sexual Cycle of Cows upon the Refraction of the Blood Serum**].—*Münch. tierärztl. Wschr.* **83.** 481-484. 3 figs., 1 table. [24 refs.]

The refraction of the blood serum of a large number of cows at various stages of the sexual cycle has been examined. Cows in early lactation or in oestrum give values below the normal, whilst pregnant animals give values higher than the normal.—W. R. WOOLDRIDGE.

I. FREI, W., & DEMMEL, M. (1932). Beziehungen zwischen Blut und Sexualzustand beim weiblichen Rind. [**Relationship between Blood and Sex Rhythm in Female Cattle**].—*Schweiz. Arch. Tierhlk.* **74.** 469-480. 8 tables. [9 refs.]

II. FREI, W., & DEMMEL, M. (1932). Der Einfluss von Gravidität und Laktation auf das Blutserum beim Rind, nebst Bemerkungen zum Problem der Gebärparese. [**Effect of Pregnancy and Lactation on Blood Serum of Cattle, with Remarks on Milk Fever**].—*Ibid.* 525-538. 5 tables. [14 refs.]

I. A general survey of data on a large number of animals. Table 1 gives serum calcium of 285 cattle arranged according to age, sex, castration, oestrum, pregnancy and occurrence of ovarian cysts—calcium of cystic fluid also being given in 25 cases. Table 2 shows relation of serum calcium to age, table 3 age to refractive index, table 4 nutritional condition to refraction ; table 5 shows variation of serum calcium in summer and winter, table 6 the influence of season and sex rhythm on serum refraction ; table 7 compares calcium, and table 8 glucose, in the serum during oestrum and interoestrums.

Differences are often small but the authors deduce, (a) fall in serum calcium with advancing age, (b) decrease of calcium in males and increase in females as a result of castration, (c) rise of calcium and glucose in oestrum, (d) a slight fall in serum refraction (protein content) during oestrum in summer and a rise in winter.

II. A small reduction of serum glucose was observed during pregnancy (40 cows) as compared with oestrum and interoestrum (average 86 to 91 mg. per cent. versus 99 to 110 mg.). The refractive index of serum, taken as a measure of the protein content, was not significantly different in 22 lactating cows as compared with non-lactating animals. In spite of the physiological demands of lactation, the composition of the blood is not greatly altered in cows properly cared for, and changes associated with clinical symptoms are exceptional. Milk fever, with hypocalcaemia or hypoglycaemia, is regarded as arising from disturbances of the endocrine and vegetative nervous system associated with parturition, rather than from the onset of milk secretion itself ; but the authors link up the endocrine system, the nervous system, vegetative centres in the medulla controlling metabolism, and the mineral equilibrium of the blood, and consider that disturbance at any one point will affect the whole chain.—H. H. GREEN.

DALY, I. de B. (1933). **Reactions of the Pulmonary and Bronchial Blood Vessels.**—*Physiol. Rev.* **13.** 149-184. 3 tables. [173 refs.]

The pulmonary vascular reactions are always associated with cardiac and systemic circulation phenomena and this has been the greatest obstacle to an accurate analysis of their mechanism. An historical account is given of the attempts which have been made to elucidate the factors influencing the pulmonary vessels ; the errors which have been made with isolated perfused lungs in an attempt to obtain controlled experimental conditions are also pointed out. More recently, however, by simultaneous perfusion of the pulmonary and bronchial systems by means of artificial pumps, it has been shown that excitation of the stellate ganglion causes pulmonary vasoconstriction, whereas stimulation of the cervical vagi and the cervical or thoracic vagosympathetic nerves produces at times strong vasodilatation.

The action of adrenalin on isolated perfused lungs has given results not always in agreement, even in animals of the same species, sometimes constriction, at others dilatation being observed. The possible causes for these discrepancies are discussed and may be briefly summarized under the following headings :—preparation used, dosage, perfusion pressure and temperature, perfusion fluid, tonus of blood vessels, species of animal and seasonal variations. Indications have been obtained which point to the probability that, at any rate in the dog, the constrictor effect of adrenalin is mostly due to an action on the arteries, whereas dilator effects, which could only be demonstrated with certainty with ergotoxine, are predominantly venous. There appears to be general agreement that adrenalin contracts the extrapulmonary portions of the whole pulmonary vascular system in such animals as the dog, cat, sheep, pig, rabbit, calf and ox. Acetyl choline in the dog's isolated perfused lung causes in some animals vasoconstriction, in others vasodilatation, both effects being enhanced by eserine and suppressed by atropine.

The pharmacodynamic aspects of vasomotor action may be summarized by saying that the available pharmacological evidence, obtained from observations on isolated perfused lungs and isolated vessels, suggests that in the dog the lungs are supplied with sympathetic vasoconstrictor and dilator fibres as well as parasympathetic vasoconstrictor and dilator fibres.

It has been shown that there is an intimate relation between the bronchial arteries and pulmonary nerves. It would seem probable that the bronchial vascular bed reacts by increased development in those areas of the lung wholly or partially deprived of pulmonary blood or the seat of pathological processes. How far resistance to pulmonary infection is diminished by occlusion of the bronchial arteries by operative interference or by disease is an interesting speculation which requires investigation.—J. A. Nicholson.

Neumann-Kleinpaul, K., & Steffan, H. (1933). Die kombinierte Elektrokardiogramm-Herztonaufnahme bei Tier und Mensch. [**Combined Electrocardiogram—Heart Sound Records in Animals and Men**].—*Arch. wiss. prakt. Tierhlk.* **66.** 1-14. 9 figs. [76 refs.]

In horses, the electrocardiographic records were obtained by means of silver-plated electrodes, one applied at the heart apex and the other beside the mid-point of the right scapula brim. Before applying the electrodes, these positions were thoroughly washed with absolute alcohol to remove grease etc. and to make clipping unnecessary. The electrodes were then covered with absorbent material soaked in salt solution and kept in place by means of bandages or special harness. The heart sounds were recorded by means of a microphone also applied near the heart apex. In the examinations described, the electrocardiogram and the heart sounds were first of all taken separately, using two galvanometers and then in combination by connecting the microphone into the circuit of the electrocardiograph, the one galvanometer string serving to record both deflections. In this case, to prevent one record from obliterating the other, a resistance was inserted in parallel circuit with the electrocardiograph or with the microphone.

This combined method has been used both in horses and in the human subject and certain cases are described in this paper. It is claimed that the method yields an important contribution to the diagnosis and prognosis of heart disease.
—J. A. Nicholson.

Spöttel, W. (1933). Ueber den Einfluss der Ernährung auf die mechanischen Eigenschaften des Haares. [**Effect of Diet on Physical Properties of Wool**]. —*Biedermanns Zlb. Agrik.-chemie B. Tierernährung.* **5.** 13-64. 13 figs.,

3 tables. [2 pages of refs.] [Summary in English : abst. from orig.]

A study of the influence of nutrition on the fineness, strength and elasticity of the hair or wool of the " Heidschnuke "—primitive German mutton sheep which subsist largely on heath grazing and live in the open all the year round. Three groups of five-month-old lambs were fed respectively on lucerne hay with a small amount of oats and dried beet, a small basal ration plus a protein-rich mixture of various oil cakes, and a semi-starvation ration, just sufficient to maintain the lambs at their original body weight throughout the year of experiment. The hairs were graded according to diameter, breaking load measured absolutely and relatively (per unit cross section), " extension phases " measured with a Deforden apparatus, and the data compared with those of normally fed sheep and sheep of other races. Increase or decrease in strength and extensibility did not run parallel with thickness in different races. Protein-rich feeding increased the mechanical qualities, especially in the hairs of medium thickness, but the results were not uniform with different diameter gradings. Protein insufficiency on the hunger ration influenced the different gradings unequally, the very fine and very thick hairs suffering most in their extension phases. In general the elasticity was more influenced by nutritional factors than was the relative load-carrying capacity. The cohesive properties of the hair appeared to lie in submicroscopical structures revealed by X-rays. Differences in behaviour of hairs of different thickness are discussed in relation to blood supply. Extremely fine and extremely coarse hairs, being located on the periphery of the net of blood capillaries, are regarded as least favourably situated. An extensive bibliography is given.—H. H. Green.

Dry, F. W. (1933). **Hairy Fibres of the Romney Sheep. III. Curly-Tip Fibres.** —*New Zealand J. Agric.* **46.** 279-288. 4 figs.

In this third and last article on hairy fibres, the author describes fibres which he calls " curly tip," a predominant fibre in the new-born lamb and one which, if tending to become hairy, is more serious than " halo-hair " or " sickle fibre."

The author's observations suggest that there is distinct tendency towards inheritance of hairy " curly-tip " fibres, but, on the other hand, there are several non-genetic factors influencing their growth such as rate of growth, differential shearing and malnutrition. The keratinizing power of different sheep and breeds is considered to be a factor and that power in cross-bred Romneys is considered by the author to be low. He says " To my mind our real objective in combating hairiness in ' crossbred ' wool must be the recognition of sheep with a reserve capital of keratinizing power."—C. S. M. Hopkirk.

TECHNIQUE.

Soule, M. H. (1932). **Anaerobic Technic.**—*J. Lab. Clin. Med.* **17.** 519-529. [7 refs.]

The author describes the various steps in a technique which has been used over a long period and has been found to be simple, convenient and satisfactory for the isolation and identification of the various pathogenic and non-pathogenic anaerobes. The methods are based on those of Novy, whose particular form of jar is preferred, and although the article probably contains little that is new to the experienced worker, it will be of value to the worker new to this ground. It is worthy of note that the author states that nitrogen obtained in compressed form in cylinders usually contains 2 per cent. of oxygen and frequently contains 6 per cent, and that commercial hydrogen is usually little better.

He emphasizes the necessity of observing the same criteria for pure cultures as in the case of aerobes, but, provided proper anaerobic conditions are maintained, does not believe that isolation and identification are more difficult.

—A. W. Stableforth.

I. Herrmann, L. G. (1932). **An Improved Method for the Cultivation of Anaerobic Microörganisms.**—*J. Bact.* **23.** 331-335. 1 fig. [10 refs.]

II. Klocker, L. (1932). Zur Brauchbarkeit der anaeroben Züchtungsmethode nach Fortner für die Rauchbranddiagnose. [**The Value of Fortner's Method of Anaerobic Cultivation in the Diagnosis of Blackleg**].—*Zlb. Bakt. I.* (*Orig.*). **125.** 525-533. [6 refs.]

III. Kleinsorgen, W., & Jusatz, H. J. (1932). Die Vervolkommung der Fortnerschen Anaerobenzüchtung durch Anwendung eines kombinierten Gummi-Zellulose-Ringes mit Drucklammerverschluss. [**An Improvement of Fortner's Method of Anaerobic Cultivation by the Use of a Combined Rubber-Cellulose Ring and Pressure Clamps**].—*Ibid.* **126.** 157-160. 1 fig. [29 refs.]

I. This is a description of an improved apparatus for the cultivation of obligatory anaerobes similar in principle and appearance to MacIntosh and Fildes' jar.

The palladiumized asbestos, which is used as the catalytic agent, is held by fine copper gauze in contact with a 6 volt 12 c.p. electric bulb. By this means the gauze is heated and the risk from explosion is reduced to a minimum, there being no exposed wires through which electric current flows. The rate of flow of hydrogen, which is directed on to the gauze, is more readily controlled by passing it through wash-bottles.

The advantages of the apparatus are that it is quite free from danger, the temperature never rises above 37·5°C. and the author says that faculative anaerobes fail to develop.

II. The series of experiments which are described in this article were planned with a view to establishing the value of Fortner's surface method of cultivating anaerobes in the diagnosis of cases of blackleg.

Chromobact. prodigiosum was employed to reduce the oxygen tension. *Clostridium chauvoei* only grew in 3 out of 69 cases when cultures were made direct from fresh muscle, but Klocker succeeded in obtaining plate cultures in 61 out of 63 cases when a rabbit-liver broth culture was first made and seed material from this material was used for the plates—in 2 out of 26 cases by direct inoculation from dried muscle tissue and in 22 out of 26 instances when a culture was first made in liver broth. When the liver broth was heated sufficiently to kill all the vegetative forms, *Cl. chauvoei* colonies were only obtained in a few instances after subculturing on to plates.

III. Having found that the method of surface cultivation of anaerobes in petri dishes, as developed by Fortner, was not altogether satisfactory, the authors elaborated a technique of their own which is described in detail.

The two halves of a petri dish, both of which contain media, are separated round their periphery by a rubber band 10 mm. broad and 8 mm. deep. On the inner diameter is attached a cellulose ring which by absorbing the water of condensation prevents it from reaching the lower plate.

The medium in the upper dish is inoculated with a suitable oxygen-absorbing organism, such as *Chromobact. prodigiosum* or *Bact. coli* and that in the lower is inoculated with the anaerobic organism. The whole is made airtight by being pressed firmly together with four spring clamps.—N. S. Barron.

LÉPINE, P. (1933). Simplification de la méthode de Castaneda pour la coloration élective des Rickettsia. [**Simplification of Castaneda's Method for Selective Staining of Rickettsia**].—*C. R. Soc. Biol. Paris.* **112.** 17-19. [3 refs.]

Rickettsia have only a feeble affinity for stains. Giemsa's method is of little use for diagnosis in, for example, vaginal films from infected guinea pigs. Castaneda's method gives varying results with different batches of methylene blue and the same objection applies in Lépine's method in respect of fuchsin.

The author now recommends a modification of Castaneda's method substituting azur II for methylene blue. The formula is as follows :—1 per cent. azur II in 0·5 per cent. carbolic solution, 10 drops ; 1 per cent. potassium carbonate, 5 drops ; neutral formalin, 0·5 c.c. ; distilled water, 10 c.c. Stain the films for three or four minutes without previous fixation. Wash quickly and apply a solution of safranin one per thousand. Wash and allow to dry. Rickettsia are stained azur blue. The solutions of azur II and potassium carbonate keep indefinitely. The prepared staining mixture keeps several days.—S. H. GAIGER.

KAPP, Eleanor M. (1933). **An Anti-coagulant in Blood Smears.**—*Folia haematol.* **50.** 68-69. 1 fig. [Orig. in English].

Rat blood coagulates very quickly and the author describes an improved technique for preparing blood films.

A separate drop of tri-sodium citrate (0·2 per cent.) and of cresyl blue solution (0·33 per cent. Grübler's brilliant cresyl blue in 95 per cent. ethyl alcohol) are deposited at one end of the slide ; both drops are allowed to dry ; the blood is mixed first with the citrate and then with the cresyl blue before being spread out in the usual way. Wright's counterstain is added before examination.

This method is said to improve the appearance of stained rat-blood smears considerably.—J. E.

DUNN, L. H. (1932). **An Effective Method for Collecting Ectoparasites from Live Animals and Birds.**—*Psyche.* **39.** 26-29.

The writer describes a method for collecting ectoparasites from small live animals or birds. The limbs of the subject are secured with tape and a large towel is placed around its neck.

The body of the animal is then placed in a large glass anatomical jar and the towel secured around the top. Chloroform is then sprinkled on the towel and its vapour, being heavier than air, sinks in the jar and stupefies the parasites. In a few minutes the animal is removed and brushed or combed over a large sheet of white paper to remove the parasites remaining on its body. These, and those on the bottom of the jar, can then be collected with a needle moistened with alcohol.—J. S. STEWARD.

POWELL, H. M., JAMIESON, W. A., & JONES, F. G. (1933). **Merthiolate as a Preservative for Biological Products. III. Action of Merthiolate on Bacteriophage.**—*J. Immunol.* **24.** 185-192. 3 tables. [9 refs.]

The results of the authors' experiments indicate that, under proper storage conditions, " merthiolate " is a satisfactory preservative for bacteriophage preparations.—GWILYM O. DAVIES.

RAISTRICK, H., & SMITH, G. (1933). **A Vacuum Evaporating Plant for Laboratory Use.**—*Biochem. J.* **27.** 96-98. 2 figs. [1 ref.]

This is a description of apparatus designed to concentrate large volumes of

liquid at a low temperature. Liquids which do not froth may be evaporated at the rate of 3½ to 4 l. per hour.

Evaporation is carried out *in vacuo*, the liquid being held in flasks immersed in a water-bath which is maintained at 50°C. The temperature of the liquid during evaporation is 20 to 25°C. Condensation of the distillate is effected by tap water.—Gwilym O. Davies.

—. (1933). **Photography in the Infra-Red.**—*Lancet.* **224.** 209.

The discovery of the cyanide group of dyes made possible the preparation of emulsions sensitive to the infra-red rays of the spectrum and, although Messrs. Ilford have recently discovered a more sensitive dye, efforts are being made to increase the speed and to extend the range of emulsions containing such dyes beyond 9,000 A° [see this *Bulletin.* **3.** 567].

The application of infra-red photography to medicine has as yet scarcely been explored. Some slight distinction can, however, be made between dead and living tissue ; in a case of lupus, healthy skin and that containing lupus nodules were shown to affect an infra-red sensitive plate differently. Similarly, pathological changes in the myocardium have been detected.

Other practical applications of this branch of photography referred to are :—(1) in ethnology ; latent racial characteristics which are not obvious by direct observation are brought out clearly in photographs taken by infra-red radiation and (2) examination of fabrics ; the degree to which black fabrics, used in the tropics, stop or pass through infra-red rays can be compared.—N. S. Barron.

MISCELLANEOUS.

Wirth, D. (1933). Sammelreferat Veterinärmedizin 1931. [**Veterinary (Haematological) Review for 1931**].—*Folia. haematol.* **50.** 112-119. [91 refs.]

The outstanding work on veterinary haematology of the year was the author's own textbook " Grundlagen einer klinischen Hämatologie der Haustiere," which, as the first book of its kind, is indispensable to workers in that field.

[As space does not permit a full abstract, the more important works only can be mentioned here].

Neseni studied the blood picture of foetal calves from the second to the eighth month. Jedlicka, working on the blood picture of calves in their first four weeks after birth, found a very high R.B.C. count (7,780,000) compared with the figure for adult cattle : the blood picture formula is here given.

Butozan and Celinscak studied the true amoeboid movements of bovine leucocytes.

Kock, in South Africa, completed a detailed study of the blood of mice. The following workers :—Rojko, Rafalowitsch, Trautmann and others, and Mischin studied the normal blood picture of the pig, camel, sheep and reindeer respectively, and Ilse estimated the total blood content of sheep.

Bürker found that the average haemoglobin content of R.B.C. is characteristic for different animal species. Steiner applied Winkler's oxydase reaction and Sato's peroxydase reaction to the study of leucocytes of many domestic animal species and found them to be of value. Sobra found the guttadiaphot method of valve for the indication of anaemia in equine practice : it is, however, not specific for particular infections. Srnetz studied the rate of bleeding in horses with a special canula in the jugular vein. Lauda found that the blood picture of cows in oestrum does not depart from the normal,

The effect of fatigue on the blood picture in troop horses was studied by Geweniger : the blood picture changes progressively with different stages of fatigue.

Krupski found culture filtrate of value in equine anaemia caused by haemolytic streptococci [a sequel to strangles occurring in Switzerland].

Doyle, Hamilton and Adsersen published papers on anaemia in suckling pigs : a blood iron deficiency occurs and can be cured by dosing with iron salts or by feeding on fresh grass.

Sanell reported success in the treatment of puerperal haemoglobinuria in 12 cows with a dose of 4 l. of defibrinated blood intravenously.

Kitt published an important review of our knowledge on the leucaemias of mammals.

Lüttschwager, Kitt, Jarmai and others published papers on fowl leucaemia : its exact aetiology is still obscure.

Fischer reported an interesting case of fatal epistaxis in a horse whose blood was found to lack blood platelets and whose bone-marrow was abnormally pale.

Schmidt and Lutz worked on fagopyrism and studied the haemolytic effect of some fluorescent substances.

Marsal found blood microfilaria in 91 Hungarian horses : they were commoner in young animals, but did not cause disease. The power of a number of agents to cause rapid coagulation of the blood after intravenous injection in the horse was studied by Srnetz and by Ryn : the results were mainly negative, sodium chloride in a large dose proving most effective.

The effect of various drugs on the blood picture was studied by some workers : the drugs included omnadin, chloral hydrate, pernocton, avertin and other narcotics, also " arsenferrol," Tr. cantharides, mustard spirit, oil of turpentine and various dyes.

Schäper and Usuelli published work on blood groups in animals.

The blood picture in various diseases—bovine contagious abortion, canine nephritis, glanders and epizootic lymphangitis, equine tuberculosis, equine oral sepsis, ovine haemonchosis, canine dochmiasis, equine sarcosporidiosis, dourine and fowl paralysis—was also studied.—J. E.

Stubbs, R. E. (1933). **Cattle Contagious Diseases Law, 1932.**—*J. Jamaica Agric. Soc.* **37.** 39-40.

Under the Cattle Contagious Diseases Law of 1932 the Governor has made regulations prescribing the conditions upon which horses intended for racing may be imported into Jamaica. The only port of entry is Kingston. Each horse must be certified as being registered in a recognized racing club or association of the country of origin or export or certified by the Jockey Club of Jamaica as being imported for racing purposes in Jamaica. It must also be accompanied by a certificate from the Ministry of Agriculture or Chief Veterinary Officer of the exporting country stating that that country is free of foot and mouth disease and also by a certificate from a veterinary surgeon stating that the horse is healthy and free of infectious disease, that it has been tested for glanders with negative results, and that no case of dourine, mal de caderas, glanders, farcy, epizootic lymphangitis, ulcerative lymphangitis, or mange has occurred in the stables or on the premises where the horse has been kept during 30 days prior to export. No horses infected with ticks or other external parasites will be admitted.

Other administrative rules provide for the inspection of horses prior to landing, for quarantine and for destruction if necessary.—F. Bullock.

I. Quinlan, J., Bisschop, J. H. R., & Curson, H. H. (1932). **A Policy regarding Native Animal Husbandry.**—*J. S. Afric. Vet. Med. Ass.* **3.** 22-25. [5 refs.]

II. —. (1932). **Native Husbandry in South Africa.**—*Imp. Bureau of Anim. Genet. Quart. Bull.* **2.** 109-110.

I. The authors recommend the study of various types of South African indigenous cattle. When types can be recognized, the advantage each has over European cattle can be seen. Such advantages might include anatomical or physiological features, resistance to hardship and disease. Subsequently attention could be paid to milk yield, beef production, etc. Such an investigation would give information on the history of African native cattle.

The policy recommended is the establishment of small herds of various types scattered throughout the country, each herd being kept so far as is practical to its natural environment. These herds would form the nuclei for investigation.

In an addendum to this article Bekker raises a similar point in connection with the native breeds of sheep.

II. This is an extract of a plan of native husbandry investigation by certain Onderstepoort workers. From the veterinary viewpoint the object is to teach the natives the elements of breeding and animal management and to teach them to assist the State in the control of diseases.—E. J. Pullinger.

Moguel, M. F. (1933). **The Trend of the Animal Industry in Mexico.**—*J. Amer. Vet. Med. Ass.* **82.** 299-307.

The first part of the paper is a review of the incidence of infectious diseases of animals which had been prevalent in Mexico during the preceding year. Anthrax had been diagnosed in 53 districts, blackquarter in 71, haemorrhagic septicaemia in 87 and swine fever in 42. In a small number of cattle in dairy districts about 23 per cent. had given positive reactions to the agglutination test for *Br. abortus* infection, while of 8,882 cattle subjected to the tuberculin test, 292 gave positive reactions. Piroplasmosis is the most serious problem in cattle ; an intensive campaign of tick eradication is in progress.

The general tendency of the livestock industry in Mexico is towards an increased home consumption of animal products, a decrease in the importation of these products, improvement in production and the gradual extinction of native breeds of farm animals.—R. S. Roberts.

te Hennepe. (1932). Diergeneeskunde en Pluimveehouderij. [**Veterinary Science and the Poultry Industry**].—*Tijdschr. Diergeneesk.* **59.** 601-611, 658-669 and 710-718. 7 tables.

An address given at the General Meeting of the Dutch Veterinary Society in November, 1931, to show the enormous field of work which awaits the veterinary surgeon in the poultry industry. After passing in review the work of veterinary research in other countries, e.g. the British Isles, France, Germany, India, Australia and America, te Hennepe points out the increasing importance of the industry in the Netherlands and consequently the increasing need for veterinary surgeons to keep themselves abreast of the times, so as to become the recognized experts in the subject and be able to instruct poultry farmers in the proper management and care of poultry and their safeguarding from disease. He advocates a central laboratory, and sets out a scheme of work to be undertaken, viz., the study of poultry diseases in themselves and in relation to diseases of domestic animals (tuberculosis, abortion, swine fever [Rice, J. P., see this *Bulletin.* **1.** 290, described a diphtheritic enteritis in fowls which he considered to be due to the swine fever

virus. Ed.], paratyphoid etc.), and especially in relation to public health. The work should include publication of results, the undertaking of routine research, the examination of secret remedies, and control of marketing and export.

—F. Bullock.

Hammond, J. (1933). **The Anatomy of Pigs in Relation to Market Requirements.**—*Pig Breeders' Ann.* **13.** 28-33. 3 figs., 1 table. [2 refs.]

The author refers to the differences in values of various joints in pork and bacon carcasses and points out that the cheaper shoulder and belly cuts have muscle intermixed with fat, whereas the more expensive back and hindquarter cuts are chiefly composed of solid muscle blocks. Photographs show how the pig foetus carries a relatively high proportion of flesh in the forequarters, as also does the wild boar, whilst in middle-white pigs, one week and 15 weeks old, the conformation alters, flesh being deposited where it is required for commercial purposes, on the back and hind-quarters. Carcass tests are advocated to determine how much loin development is muscle and how much is fat and the breeding from animals that have given good results in such tests should be encouraged. Food should be rich in proteins and, whilst exercise may not increase muscle thickness, it will decrease the proportion of fat in the carcass.

[The photograph of the middle-white pig resembles more closely that of a cross-bred large and middle-white, whilst there is constant reference to the middle-white breed as though it was the ideal commercial pig. The bacon industry prefers the large-white breed or its crosses. See Jackson, F. W. (1932). "Type of Pig required by the Bacon Curer."—*Vet. J.* **88.** 448].—D. J. Anthony.

Flückiger, G. (1933). Réglementation des transports internationaux des animaux et produits animaux sur route par automobiles. [**Regulations concerning the International Transport of Animals and Animal Products by Road**].—*Bull. Off. internat. Epiz.* **7.** 157-167.

The author gives a review of replies received from 14 European countries, together with Egypt and the Argentine Republic, showing that the transport of animals and animal products by road has greatly increased, but that it has many disadvantages compared with rail transport. He submits for the approval of the Office International des Epizooties the following propositions :—

For reasons of sanitary police and control of epizootic diseases, as well as the protection of animals, the transport of animals and animal products by motor lorry should be subject to the same rules as apply to rail transport.

Special provision should be made for the disinfection of motor lorries as is done for railway wagons.

International traffic of animals and animal products by road transport should be prohibited except in special cases, e.g. between small neighbouring countries like Belgium and Luxembourg.—F. Bullock.

I. Orr, J. B., & Fraser, A. H. H. (1932). **Restoring the Fertility of Scottish Sheep Grazings.**—*Trans. Highland & Agric. Soc. Scotland.* **44.** 64-85. 3 tables. [1 ref.]

II. Fraser, A. H. H. (1933). **Some Economic Aspects of the Scottish Sheep Industry.**—*Scot. J. Agric.* **16.** 152-160.

I. It was shown by Sir Robert Greig that whilst the number of breeding sheep in Scotland has increased on arable ground it has decreased in hill areas. The authors point out the economic consequences of this in view of the fact that the source of sheep stock for the arable counties lies in the hills (hill gimmers or

cast ewes being bought in for cross-breeding) and provide a progress report on a study of the nutrition of sheep at Garrochoran, a hill farm in Argyllshire.

The results indicate deficiency both of minerals and of calories in the hill pastures. A mineral supplement of steamed bone flour, chalk, and salt, markedly increased the production returns while the feeding of a small amount of maize along with the minerals almost doubled the value of the annual produce. The results also showed increased birth-rate and decreased death-rate amongst the stock of black-faced ewes, and it is considered that the effects of improved nutrition would be cumulative.

From the scientific point of view the results are clear, although from the point of view of profit and loss the full practical significance of supplementary feeding will not be reflected until 1936 when the ewe lambs valued in Aberdeen in 1931 return as cast ewes with complete records of production behind them.

II. A study of the various factors involved in the success or failure of the Scottish sheep industry. A short history of the industry is given, current breeding practice is discussed, questions of grazing areas, rectification of nutritional deficiencies, pasture improvement, and control of disease are considered, transport charges, market prices and seasonal glut factors are analysed, and the general conclusion is drawn that efficient market organization is the main hope for increased prosperity.

Practical ingenuity and agricultural science can be trusted to deal with such difficulties as may arise and output will automatically increase with better prices and expanding markets.—H. H. Green.

van der Steur, A., & Lourens, L. F. D. E. (1932). De Ryksseruminrichting. [**The State Serum Institute (Rotterdam)**].—*Tijdschr. Diergeneesk.* **59.** 1205-1220. 12 photographs.

A description of the newly erected Institute for the preparation of veterinary sera and vaccines. In co-operation with the Veterinary Service of Holland, prevailing veterinary diseases are also investigated at the Institute, which was founded by Poels in 1904.—J. van der Hoeden (Utrecht).

Tschachotin, S. (1933). **The Crisis in Scientific Research and the Way Out.**—*Science.* **77.** 426-427.

The author complains of the vast flood of scientific literature poured out from research stations, academic societies and individual students on every conceivable subject in text-books, reports, articles in journals of all kinds, theses, dissertations, monographs, etc., and proposes that an international committee might be appointed to consider the problem of organising systematically the output of such literature.—F. Bullock.

—. (1933). **Language in the Service of Science.**—*Nature.* **131.** 741-743.

Editorial comments on Dr. Cyril Norwood's discourse at the Royal Institution in which he criticized the scientific writer who cannot or does not make himself intelligible to ordinary people. It would well repay scientists to cultivate a clear and precise style, using technical terms sparingly, cutting out redundant words and circumlocutions, and always striving for simplicity. A few good rules are given :—prefer the active form of the verb to the passive, avoid noun-adjectives, study the use of hyphens and be sparing with metaphors and analogies. The chief obstacles to precise statement are want of clear thinking, bad choice of words, the use of too many abstract nouns and faulty arrangement.—F. Bullock.

CUNNINGHAM, Eileen R. (1933). **The High Cost of German Medical and Scientific Periodicals.**—*Science.* **77.** 409-410. [9 refs.]

The Medical Library Association of America has issued an appeal to German scientific and medical societies and to editors of medical journals, asking for their co-operation to bring about a decrease in the present exorbitant cost of German medical periodicals. If the prohibitive charges now made cannot be reduced, medical libraries everywhere will be compelled to cancel their subscriptions.

—F. BULLOCK.

MARRIAN, G. F., & HASLEWOOD, G. A. D. (1932). **Equol, a New Inactive Phenol isolated from the Ketohydroxyoestrin Fraction of Mares' Urine.**—*Biochem. J.* **26.** 1227-1232. 2 tables. [8 refs.]

A dihydroxy phenol, 189 to 190·5° m.p., has been isolated from pregnant mares' urine. The substance has been called equol. The separation of equol from the oestrus-producing hormone present in the urine is described. Equol itself has no oestrus-producing action.—W. R. WOOLDRIDGE.

OFFICIAL AND OTHER REPORTS.

COMMONWEALTH OF AUSTRALIA. (1932). **Sixth Annual Report of the Council for Scientific and Industrial Research for the Year ended June 30th, 1932.** pp. 61. 1 appendix. Canberra : Government Printer. [fcp].

The report summarizes the work of the Council under the six Divisions of Plant Industry, Economic Entomology, Animal Nutrition, Animal Health, Soil Research and Forest Products.

Entomological investigations have been carried out under the following headings :—entomological control of noxious weeds, the buffalo-fly pest (*Lyperosia exigua*), the sheep blowfly pest, and orchard and forest pests.

The Division of Animal Health has extended its activities through the establishment of the McMaster Animal Health Laboratory and the Cattle Diseases Research Station in Northern Queensland. The work of the Division has been mainly investigations into black disease of sheep, " foot rot " and caseous lymphadenitis, pulpy kidney of lambs and parasitological problems. In addition, steps have been taken to secure the introduction of Zebu cattle for cross-breeding experiments in Northern Australia.

The Division of Animal Nutrition has carried out an investigation into the basal metabolism of sheep, and also into the effects of the removal of the thyroid and pineal glands from sheep, the effect of cystein content of the diet on wool production, and the effect of continuous phosphorus deficiency on sheep receiving a diet adequate in all other respects. Various field investigations have been carried out also in several States of the Commonwealth.

A list is given of the scientific bulletins and pamphlets issued by the Council during the year under review.—I. CLUNIES ROSS.

UNION OF SOUTH AFRICA, Department of Agriculture (1933). Lectures and Discussions at the **Meat Production Course** held at Pretoria, Jan. 9th-17th. pp. 165. [Mimeographed fcp.]

Dr. P. R. VILJOEN, Under Secretary for Agriculture, opened the course with a speech outlining the Government's pastoral policy. It has been decided to concentrate particularly on cattle raising in order to gain a footing in the chilled meat import trade into Great Britain. This was made possible by virtue of the

Ottawa Conference.

The course consisted of several lectures and discussions on all aspects of this matter, some being veterinary in character.

Dr. P. J. du Toit lectured on veterinary problems, giving a résumé of the most important diseases affecting cattle in the Union and indicating the extent to which they can be eradicated and checked. It is of the greatest importance to a meat-exporting country to ensure that no diseased meat is discovered on arrival in the importing country.

Dr. H. H. Curson lectured on the poisonous plants of South Africa, showing that extensive investigations had already been carried out. Methods of avoiding losses of livestock by plant poisoning were outlined : the chief factors associated with plant poisoning are shortage of good pasture grasses, the transference of cattle to a new area having a different flora from their native ground and accidental poisoning by poisonous plants included in hay. Methods of eradication of poisonous plants must vary widely ; one interesting example related concerned *Cotyledon ventricosa*, which was eradicated from one district by an enterprising farmer offering a price for plants collected by natives.

Mr. P. S. Snyman lectured on the tendency of meat to perish, describing the normal *post-mortem* changes in a carcass, and showing how slaughter technique affects the keeping quality. He also lectured on the practical points of tick eradication by dipping, describing the best methods of tank construction and management generally.

The following list of lectures was delivered, all but one being in English, that by Dr. Malan being in Afrikaans ; Economic Survey of the Meat Industry by Dr. C. H. Neveling, pp. 5-17. Quality of Meat by Mr. D. J. Schutte, pp. 18-23. Beef Breeds by Dr. P. J. Schreuder, pp. 24-37. Demonstration on " Feeding of Cattle for Export," by Mr. D. J. Schutte, pp. 38-39. Preparation and Transport of slaughter stock by Mr. D. J. Schutte, pp. 40-42. Marketing in South Africa by Mr. J. R. McLoughlin, pp. 43-49. Poisonous Plants by Dr. H. H. Curson, pp. 50-57. Mutton Sheep by Mr. G. J. Schuurman, pp. 58-67. Pasture grasses by Dr. E. P. Phillips, pp. 68-76. Artificial Pastures by Mr. J. Fisher, pp. 77-84. Feeding and management of slaughter stock and general discussion of the pasture problem by Mr. J. Fisher and Dr. P. J. Schreuder, pp. 92-132. Mineral Deficiencies by Dr. A. I. Malan, pp. 133-142. Perishability of Meat by Mr. P. S. Snyman, pp. 143-145. Extension work in connection with meat production by Mr. M. J. Joubert, pp. 146-155. Veterinary Problems by Dr. P. J. du Toit, pp. 156-158. Eradication of Ticks by Mr. P. S. Snyman, pp. 159-162.—J. E.

—. (1933). Trabajos del Instituto de Biología Animal. Volumen primero. [C. Ruiz Martinez, Director]. [**Work of the Institute of Animal Biology**]. Madrid : Direccíon General de Ganadería e Industrias Pecuarias. pp. 236. [4to.]

The Institute of Animal Biology was established in 1931 in accordance with the decree organizing the State Veterinary Department [see this *Bulletin*. **2.** 678.] and this is the first report of its work.

The laboratories, described and illustrated by several photographs, are contained in the " Escuela de Ingenieros Agronómos, Madrid." The original work presented in this volume is arranged under the heads of physiology and zootechny, and animal pathology. The results of analytical and diagnostic work in both sections are also given in tabular form. There are 14 original papers : most of them are of direct veterinary interest and will be abstracted in this *Bulletin*.

—J. E.

BOOK REVIEWS.

Tomson, W. B. [M.D., Medical Superintendent of the " Sea-View " Sanatorium, St. Leonards-on-Sea]. (1932). **Fluid Milk in its Relations to the Tuberculous and Tuberculosis Care Committees.** pp. 48. [4 refs.] London : Baillière, Tindall & Cox. [8vo.] [2s.]

The author has gone to some trouble to collect data for the enlightenment of Tuberculosis Care Committees. The opening chapter deals with the value of milk as a food and is followed by a chapter on the dangers attending the consumption of milk. Then follow accounts of efforts now in vogue to prevent human infection from milk, with special emphasis laid upon pasteurization. The theme throughout the book is that pasteurization is the only practicable measure to prevent bovine tuberculosis in human beings, though the author recognizes the force of the argument that, if pasteurization be accepted as all-sufficient, efforts to eradicate the disease in bovines would probably be relaxed.

References in the text to " non-pulmonary tuberculosis " indicate that the author has overlooked recent observations which show that pulmonary tuberculosis in human beings is caused by the bovine type more frequently than is generally assumed. Grade A (T.T.) milk is said to be allowed not more than 2,000,000 bacteria per c.c. and pasteurized milk not more than 1,000,000 per c.c.

On the whole the book serves a useful purpose in helping to educate the layman on this subject.—S. H. Gaiger.

Klimmer, M. [Dr. med. vet. & phil., Professor of Dairying and Veterinary Hygiene and Director of the Institute of Veterinary Hygiene of Leipzig University]. (1932). Milchkunde mit besonderer Berücksichtigung der Milchhygiene und der hygienischen Milchkontrolle. [**Dairying, with Special Regard to Milk Hygiene and Hygienic Milk Control**]. pp. x+212. 42 figs., 3 plates in colour, 15 tables. Berlin : Richard Schoetz. 2nd Edition. [8vo.] [RM. 10.60].

The volume at hand is a fully rewritten and much enlarged edition of the work which was published by the same author in 1929 under the title " Tierärztlichen Milchkontrolle " [Veterinary Milk Control]. The purpose of the enlargement was to provide a text book for students of both animal and human medicine and at the same time to provide a book which would be of value to the nutritional chemist, to the farmer and to those who handle milk either at the farm or in the large depots.

Naturally in a book of this size it was not possible to include all that would be required by each of these various classes of workers. The author has, therefore, as in the previous edition, been guided in his choice of material by practical requirements. To this end details of a predominantly theoretical nature have been dealt with briefly and, for the same reason, the handling of milk and the regulations governing its production have been given considerable attention.

" Milchkunde " deals with the general properties of milk and its composition ; with milk hygiene, particular attention being paid to tuberculosis, contagious abortion, and mastitis, to the feeding and housing of the cattle and to all that pertains to " clean milk " ; with milk control on the farm, in the bacteriological and in the chemical laboratory, and, finally, with the various regulations which exist in connection with milk, butter and cheese in Germany to-day.

—A. W. Stableforth.

GARDNER, A. D. [M.A., D.M., F.R.C.S., Fellow of University College, Oxford]. (1931). **Microbes and Ultramicrobes.** pp. viii + 120. 21 figs., 5 tables. [19 refs.] London : Methuen & Co., Ltd. [8vo.] [3s. 6d.]

This book is written primarily for students and workers in biology, to provide them with an adequate account of the viruses and bacteriophage. It will be found of great interest also by medical and veterinary students who wish to obtain a broader conception of these subjects, as they are treated in a comparative manner including the viruses of interest in plant pathology. The author leans to the view of BORDET and others that the bacteriophage is a product of the bacterial cell, rather than to D'HERELLE'S virus theory. The various views concerning bacteriophage are well presented and the reader is enabled to judge them for himself.

—S. H. GAIGER.

RILEY, W. A. [Ph.D., Sc.D., University of Minnesota] & JOHANNSEN, O. A. [Ph.D., Cornell University]. (1932). **Medical Entomology. A Survey of Insects and Allied Forms which Affect the Health of Man and Animals.** pp. xi + 476. 184 figs., 1 appendix. [650 refs.] New York and London : McGraw-Hill Book Company, Inc. 1st Edition. [8vo.] [$4.50].

This book is an entirely revised issue of the *Handbook of Medical Entomology* which appeared 18 years ago. It is produced under its new title as a first edition. The same authors have recast the material to consider the various hominoxious forms of insects and arachnids in their systematic order. The text includes up-to-date information derived from the results of recent research in the field of human and veterinary science. A short account is given of pioneer works on the transmission of diseases by insects and on the ways in which arthropods may affect the health of man and animals. Crustacea of importance as intermediate hosts of human helminths are briefly discussed. The chapters on Arachnida deal with poisonous spiders (Araneida) and scorpions (Pedipalpida and Scorpionida) ; parasitic mites (Acarina) and the ticks (Ixodoidea).

Observations are made on the treatment of bites of the poisonous and urticating forms, on the control and destruction of parasitic species and on the role of the parasites as vectors of diseases. Attention is drawn to the uses of some arthropods in medical practice. A key is given to the divisions of Arachnida of greatest importance to medical or veterinary entomologists, viz :—to the families of Acarina, the genera of Tarsonemidae, Tyroglyphidae, Sarcoptidae, Argasidae, Ixodidae, and to the sub-families of Parasitidae (Gamasidae). As regards the Insectae, attention is given to the essential features of the structure and development of insects, to the general characters and biology of the various orders, the Orthoptera, Ephemerida and Trichoptera, Anoplura, Hemiptera, Coleoptera, Lepidoptera, Diptera, Siphonaptera and Hymenoptera of greatest importance to human beings and domestic animals. The more detailed classifications of some of these orders, and more particularly of the mandibulate and haustellate Diptera, should prove useful to the professional worker in the field. Directions for the use of hydrocyanic acid gas as a fumigant against household insects are given in the appendix. The book contains a subject index and a bibliography of 31 pages.

—E. ANEURIN LEWIS.

CREED, R. S., DENNY-BROWN, D., ECCLES, J. C., LIDDELL, E. G. T., & SHERRINGTON, C. S. (1932). **Reflex Activity of the Spinal Cord.** pp. viii + 188. 71 figs., 10 plates, 4 tables. [209 refs.] Oxford : Clarendon Press. [4to.] [10s.]

The movements of an animal generally and the mechanism which obtains

and maintains its equilibrium usually give little thought to the onlooker. The beautifully arranged mechanism, however, by which associated muscles have their activities co-ordinated, has been largely explained by the illuminating researches of Sherrington. This book, which is based on original work by the Oxford School, unfolds step by step the manner by which the afferent messages which reach the spinal cord, ultimately give rise to efferent messages resulting in co-ordinated purposive responses in the muscles. The brain itself need take no part in these reflexes, which may be entirely mediated in the cord.

The opening chapter discusses the physiology of a simple reflex arc and, after dealing with the grey matter of the cord, the more complicated reflexes are discussed in detail. [We observe that the authors in their description of the composition of the dorsal roots of the spinal nerves give no credence to the work of KURE].

The volume is well printed, and contains many plates showing excellent reproductions of original tracings. From its compactness and the amount of information contained within its pages, this book should prove of great value to those interested in the physiology of posture and locomotion.—HENRY DRYERRE.

Revue Vétérinaire Slave.

In May, 1932, there was founded l'Union des Vétérinaires Slaves, which consists of veterinarians of the Slavonic race living in Poland, Bulgaria, Czechoslovakia and Yugoslavia.

In order to make their work known to the veterinary world, the Union decided to publish an abstracting journal, using either English, German or French for translated titles and abstracts. In this way eight Polish, three Bulgarian, eight Czechoslovakian and two Yugoslavian journals dealing with veterinary work are being dealt with : number one appeared in May and number two in August of this year. It is not stated how many issues will compose a volume.

The first two issues each cover 40 octavo pages and cover some 80 original articles arranged according to subject matter. Original articles beginning from January, 1932, have been abstracted.

This periodical is a valuable addition to veterinary abstracting literature and makes available a great deal of useful information. The *Revue* is offered free to recognized educational establishments of the world ; otherwise the price per issue is Fr. 2 (Swiss). The editor is Dr. MILLAK, Warszawa 21, Al. Wojska Polskiego 23, Poland.—J. E.

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